the OIL AND GAS JOURNAL

Carolyn Carter

"So I said then to the Lane-Wells man..."

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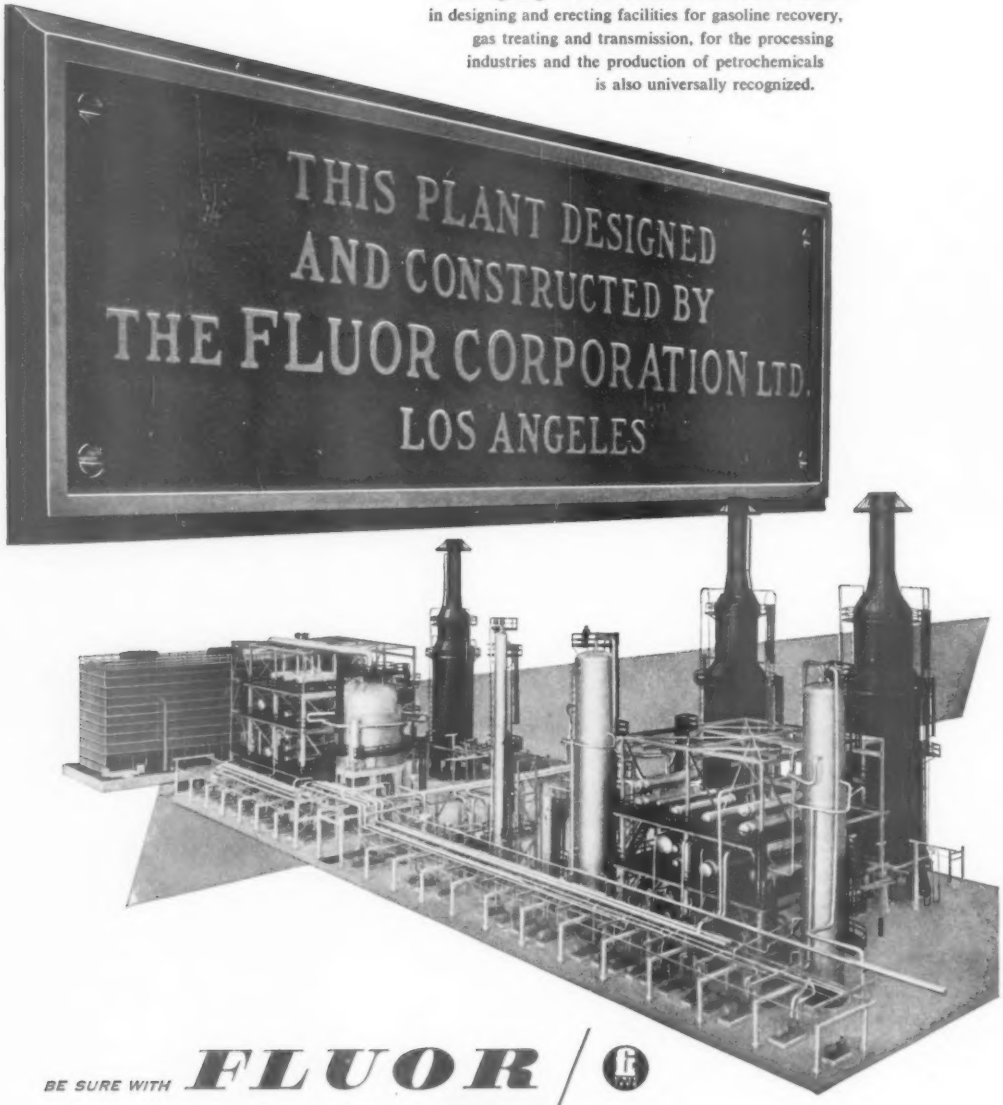

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JOURNAL

Vol. 51, No. 36

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- Rules and Regulations of the Texas Railroad Commission—Part 3.
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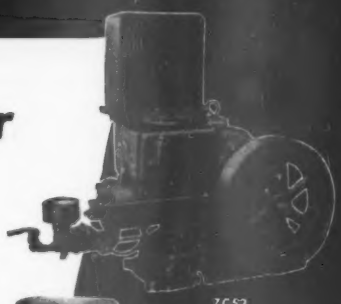
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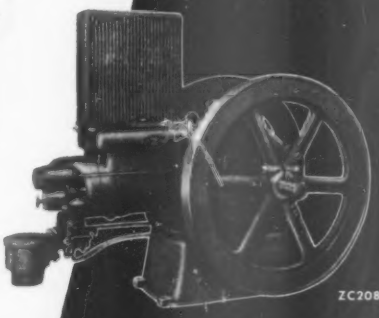
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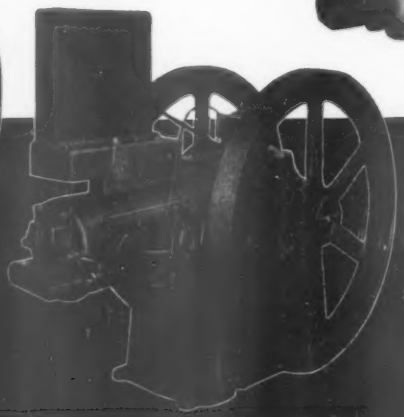
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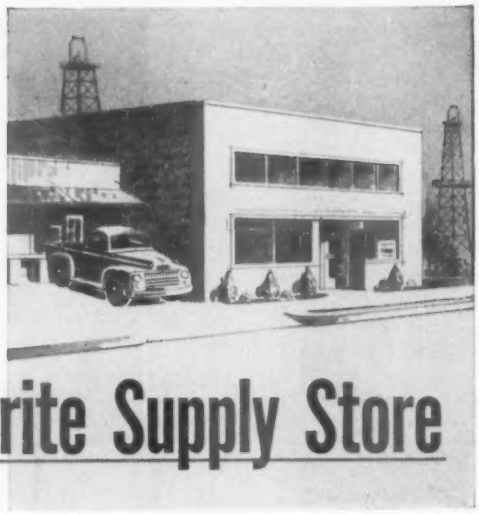

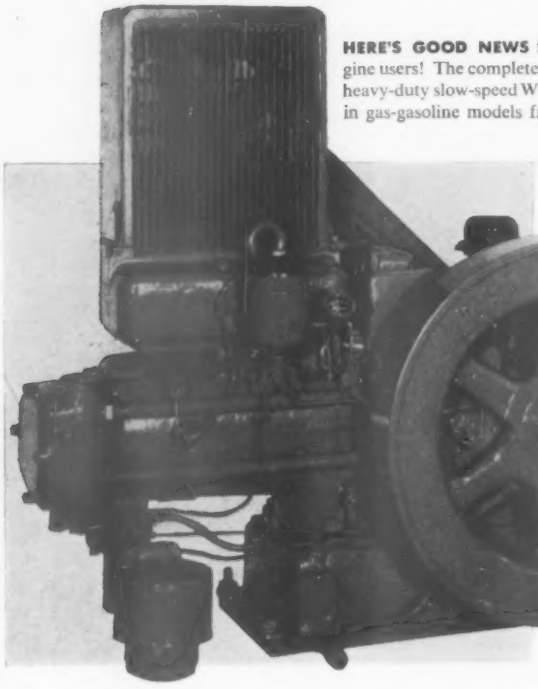

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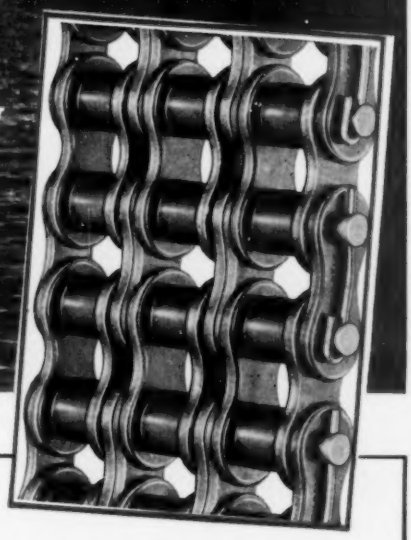

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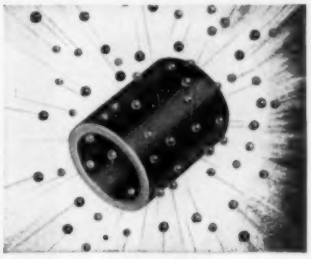

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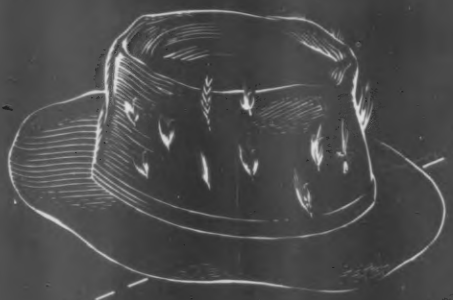

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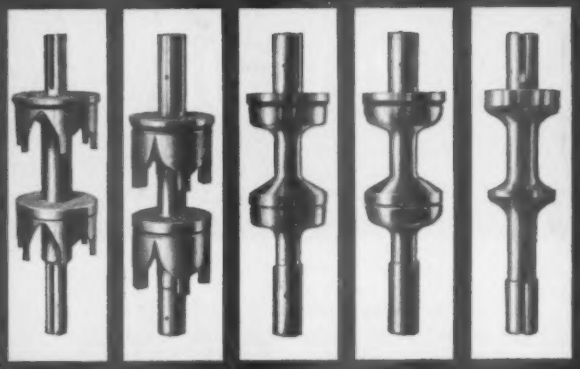

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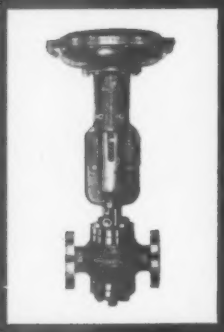

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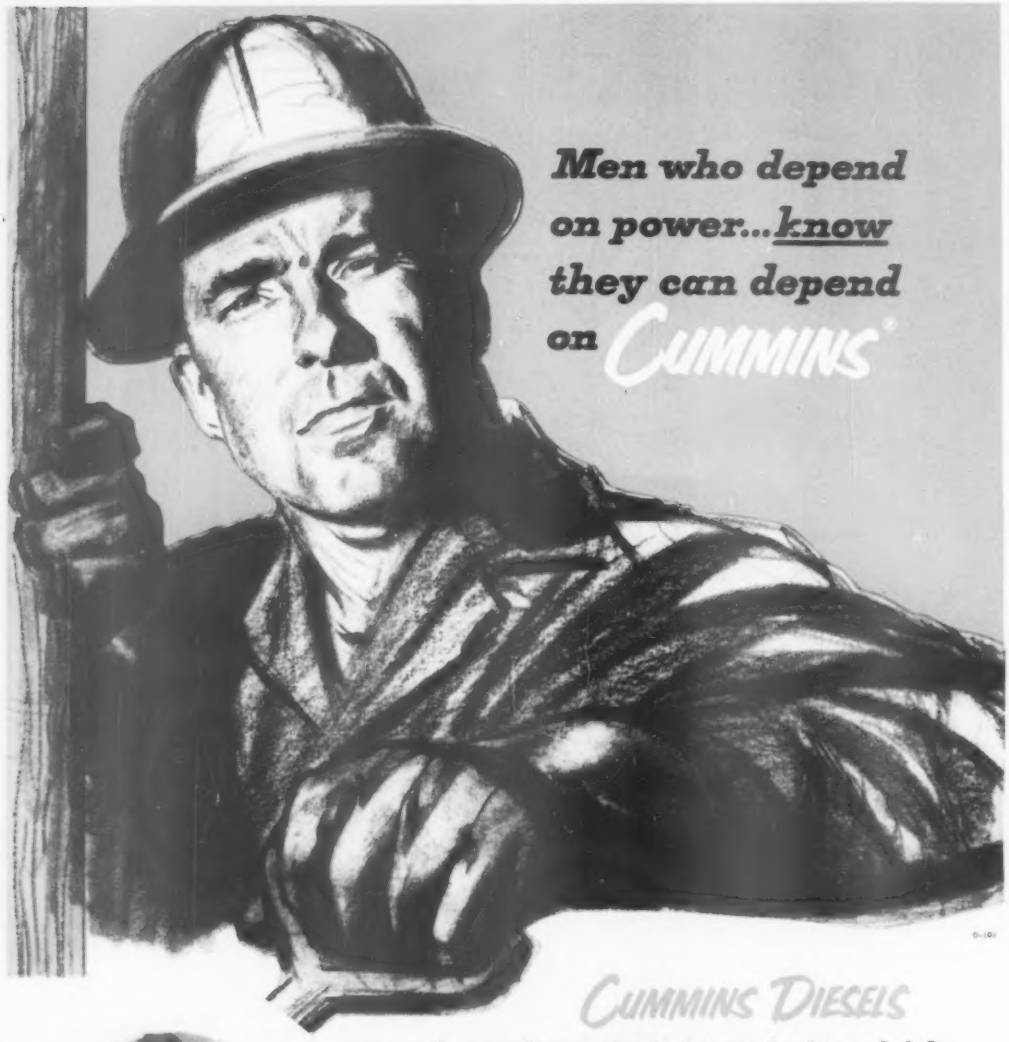

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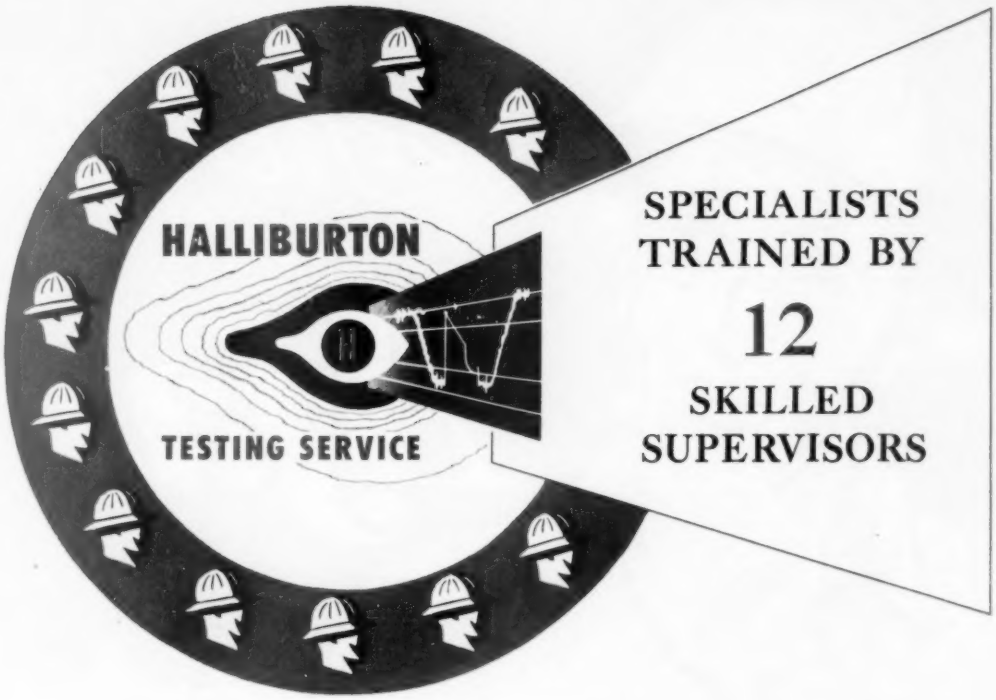

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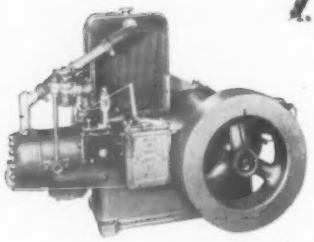

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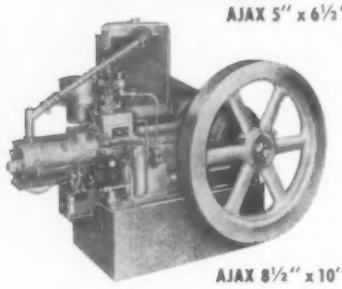

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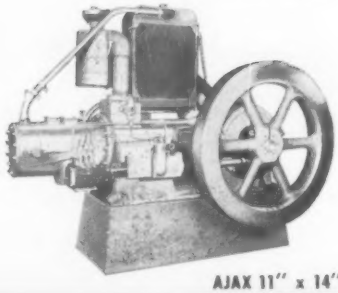

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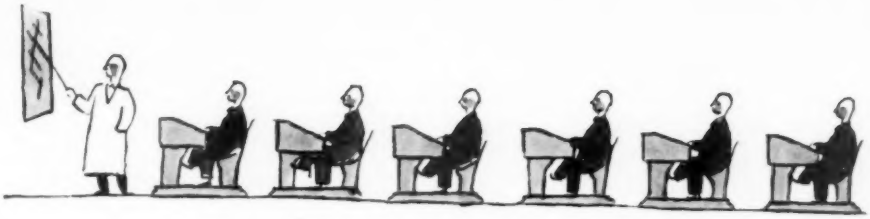

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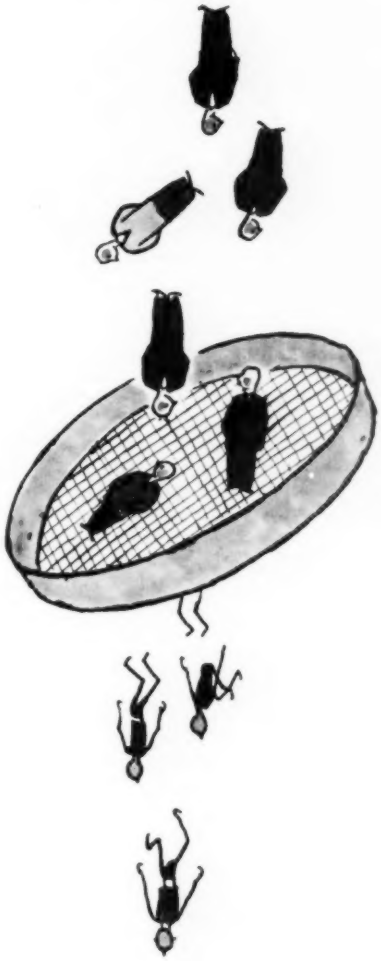

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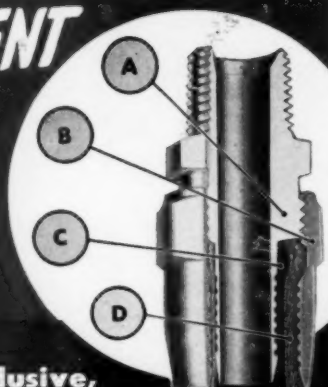

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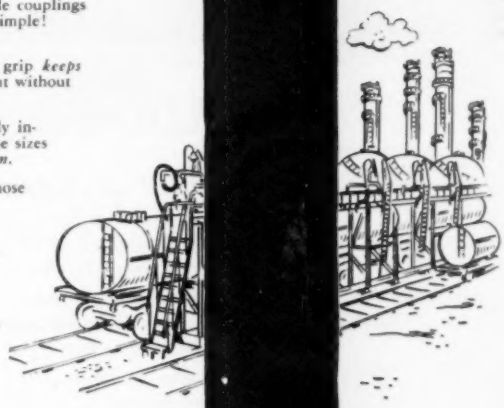

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I'm interested in Anchor 2-piece reusable Couplings. Send me further information.

NAME..... TITLE.....
COMPANY NAME.....
COMPANY ADDRESS.....
CITY..... (. . .) STATE.....

Unrecoverable

It doesn't take a great amount of memory prodding to recall yesteryear and the familiar characterization, "unrecoverable" . . . the old story of inadequate drilling and completion methods. Today, there are only enough "unrecoverables" to keep the word in oil field jargon. Why? . . . Because the men who manufacture equipment, provide services, and handle distribution have worked closely with oil companies in improving metallurgy, rigs, cementing, logging, muds, pressure controls, distribution methods, and a multitude of other equipment and supplies too numerous to mention. The suppliers, service organizations, and manufacturers have actually made the oil companies' problems their problems . . . to make OIL a powerful instrument in world economy.

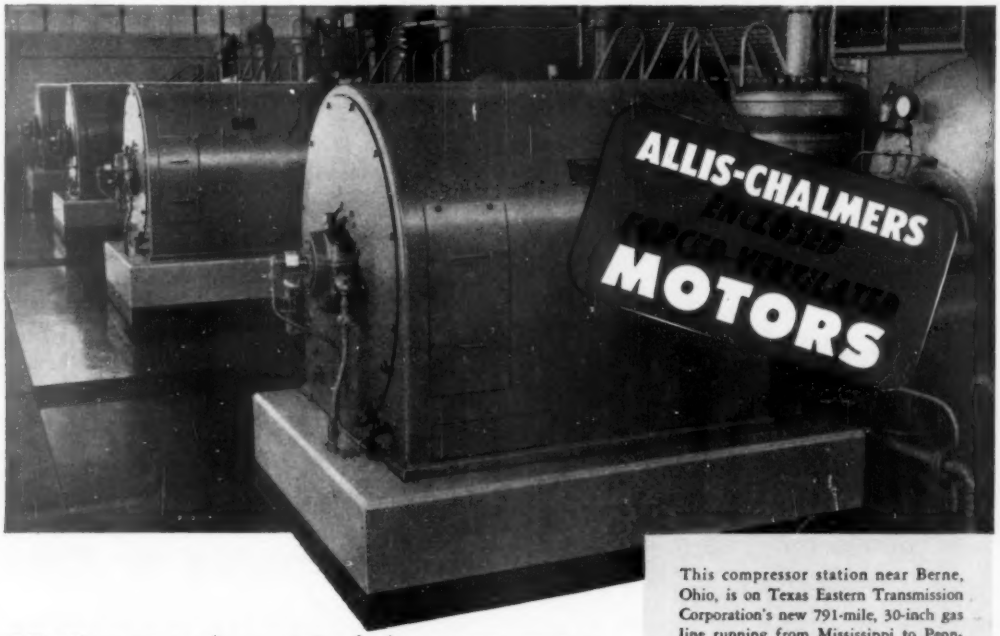
P·E·S·A
PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION
PARTNERS IN PETROLEUM PROGRESS

Petroleum Equipment Suppliers Assn.

8536 MELLIE ESPERSON BUILDING, HOUSTON, TEXAS

5-STAR ECONOMY

★ ★ ★ ★ ★ for Pipe-Line Stations

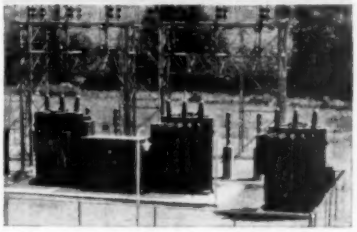


This compressor station near Berne, Ohio, is on Texas Eastern Transmission Corporation's new 791-mile, 30-inch gas line running from Mississippi to Pennsylvania. The four Allis-Chalmers forced-ventilated cage motors shown are rated 2500 hp, 3600 rpm each. A-C also supplied the unit substation shown below.

HERE'S an easy-to-take prescription for low-cost compressor or pump drives: Start with Allis-Chalmers enclosed forced-ventilated motors . . . then add a common ventilating system. That's all there is to it, but you get these five advantages:

- ★ The motors cost little more than open motors.
- ★ They need scarcely any attention because they operate in cool, clean air. (And the heated air can be discharged outside the motor room in summer and used for heating in winter.)
- ★ Protection for these hazardous locations is provided by supplying the ventilating air under pressure — during starting and during operation.
- ★ The motors are designed for the installation. They can, for example, be built for foundation, side or top air ducts.
- ★ Motor details are designed for easy installation and maintenance . . . plus longevity: Capsule-type housings permit access to motor interior without exposing bearings. Dual oil rings provide uniform, uninterrupted lubrication. Supplementary forced-feed oiling system on 3600-rpm motors is self-contained and air-cooled.

A-3879



Your A-C representative can help you decide where to use these modern pipe-line motors. Allis-Chalmers, Milwaukee 1, Wis.

ALLIS-CHALMERS

WHERE THE GREAT NAMES IN METAL FUNNEL THROUGH TO YOU!

Many major benefits are yours when you specify any of the metal and industrial supplies identified by these well-known *trade marks*. Each mark stands for a line of products of superior value. Each symbolizes a manufacturer of established reputation and integrity—with a wealth of manufacturing and applicational know-how.

To these inherent advantages Metal Goods Corporation adds the time-saving convenience of centralized supply from our nearby warehouses; plus the benefit of personal on-the-spot consultation between our technical men and yours.

Many metal users in the Central South and Southwest are profitably depending on Metal Goods Corporation for their aluminum, brass, copper, inconel*, monel*, nickel*, stainless steel, and steel—fastenings, fittings and many other special industrial metal products they require. We invite you to try us for your metal needs.

*Not stocked in St. Louis or Kansas City Territories.

Please call, wire, or write the following Metal Goods Corporation representative nearest you.

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Phone: NOrclay 3516

Tulsa 3, Oklahoma
302 North Boston
Scott J. Harrison
Phone: 4-1175

Houston 3, Texas
711 Milby Street
Harris T. Gregg
Phone: CEntral 8881

Denver 2, Colorado
2425 Walnut Street
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Phone: AComa 5891

Dallas 9, Texas
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New Orleans 12, La.
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Carl T. Wedemeyer
Phone: CAnal 7373

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Phone: 7-8921

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Phone: 5-2711

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Phone: 8-1314

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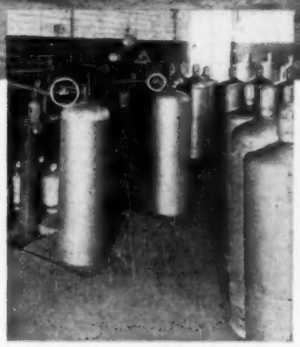


Rockwood Ball Valves handling "bottled gas" are operated every two minutes during the day. Tight seal makes them real production boosters and cost cutters.

They call it

"THE LEAK-PROOF FLEET"—

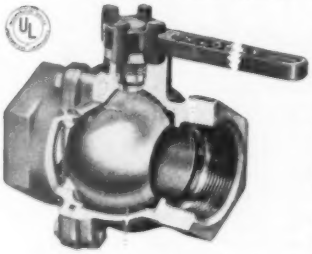
It's equipped with Rockwood Ball Valves

Carrying bottle gas in bulk over city streets is ticklish business.

But this large Transport Company made one decision and stopped a thousand worries. They equipped the fleet throughout with Rockwood Ball Valves. Not even the bumps of rough pavements or the jolts of quick stops and starts unseat these close-fitting valves.

Best part of it is, Rockwood Valves *stay* leak-proof. They resist wear, yet retain the quick-opening and closing features. They require no maintenance.

WHAT YOU WANT . . . ROCKWOOD HAS



Tested by Underwriters' Laboratories, Inc.

Full Round Flow, with no change in shape or volume of the fluid and no turbulence. Minimum friction loss.

Quick Operation in opening and closing means faster loading and unloading.

Long Life, because made to resist abrasion and wear.

Low Maintenance because engineered to stand up under an anticipated daily grind.

ROCKWOOD *FULL-FLOW* BALL VALVES

THE FLOW IS AS ROUND AS THE PIPE ITSELF

Get complete details on this great new advancement in valve engineering. Send for booklet.

Distributors in all principal cities

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Send me illustrated folder V-4 on Rockwood Full-Flow Ball Valves.

Name .....
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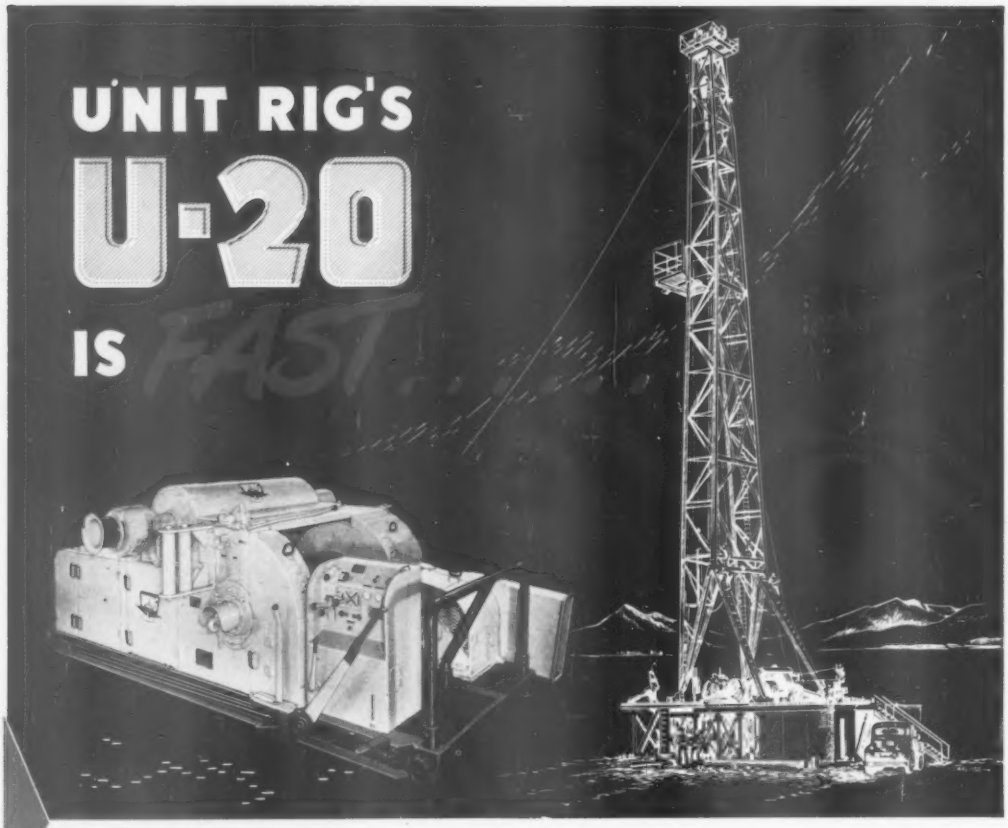
Company .....
Street .....
City .....
Zone ..... State .....

UNIT RIG'S U-20 IS FAST...



The Model U-20 Drawworks has proven that it is a fast, smooth economical rig even under difficult drilling conditions. Drill Faster - - - with the SIX speeds to the rotary table ranging from 57 to 626 R.P.M. at maximum engine speed. Hoist Faster - - - with the SIX drum speeds, divided into a high and low range. SPEED - - - for hoisting empty blocks and POWER - - - for raising off slips readily available thru single lever high-low clutch control. Maximum trip speed is attained by the free spooling drum, hydromatic brake pipe "fall" control and the large powerful drum brake.

Buy Speed - - - Buy The Best - - - Buy The U-20

UNIT RIG & EQUIPMENT CO. TULSA, OKLAHOMA U.S.A.

DESIGNED FOR THE JOB...

UR-521

UNIT RIG DRAWWORKS ARE SOLD EXCLUSIVELY THROUGH THESE AUTHORIZED DISTRIBUTORS IN THE U.S.A. AND CANADA

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HOUSTON OIL FIELD MATERIAL COMPANY
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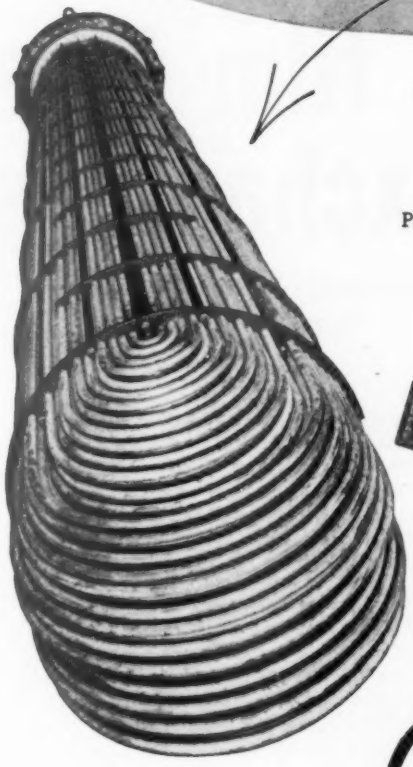
EXPORT SALES — MIDCONTINENT SUPPLY COMPANY, 42 Broadway, New York City. Cable— MIDUNITRIG

Bending and rolling-in go like a breeze with *Carpenter* Stainless Tubing



Thousands of feet of ⅛" O.D. x 16 gauge Carpenter Stainless Tubing are handled by this fabricator. And the uniformly easy way the tubes respond to fabrication gets important process jobs started on schedule.

When your process work calls for Stainless Tubing or Pipe, it will pay you to call your nearest Carpenter Distributor. He can give you the kind of help that keeps essential processes going.

BENDING and COILING Slide Chart...

Part of Carpenter's service to help you conserve critical materials is this Slide Chart for Stainless Tubing and Pipe. It gives bending radii and coil diameters for various sizes and gauges. A note on your company letterhead will start this Carpenter Slide Chart on its way to you.

THE CARPENTER STEEL COMPANY

Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y. — "CARSTEELCO"

Carpenter

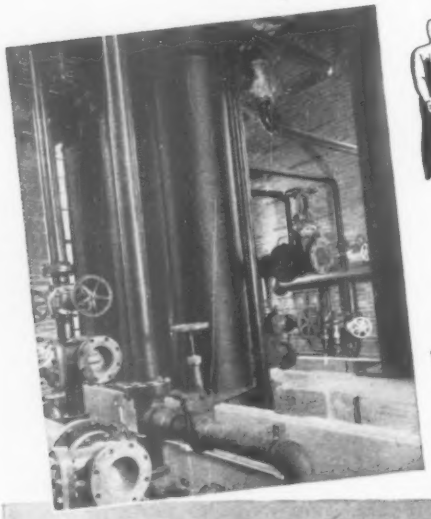
STAINLESS TUBING

—guaranteed on every shipment

THE U.S. NEEDS YOUR STEEL SCRAP NOW

Dirty Water can't "Shut-down"...

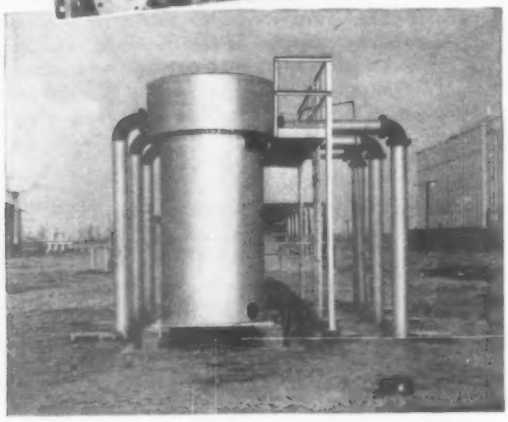
Vogt



film type exchangers

(Condensers—Coolers—Evaporators)

Patent Nos. 1,935,270 - 2,057,597 - 2,424,441



River water, well water or brackish water are all alike to this exchanger *because it can be cleaned* while in operation! The water distributing ferrules need only be removed successively for the cleaning brush or tool whereby the tubes receive additional water which sluices away the dislodged dirt.

Vogt Film Type Exchangers are operating with real economy of first cost, operation and maintenance in power, petroleum, and chemical industries. They serve as Jacket Water Coolers, Feed Water Heaters, Hydrocarbon Evaporators, Sulphuric Acid Coolers, and Sulphur Dioxide Condensers, and can be designed to cool or heat any liquid and to condense or evaporate any fluid.

TOP: *Four units at Newton Falls, Ohio Municipal plant cool water for diesel engines and a lubricating oil cooler.*

BOTTOM: *Jacket Water Coolers serving engines of 7,300 HP in the compression plant of a Western Oil Refinery.*

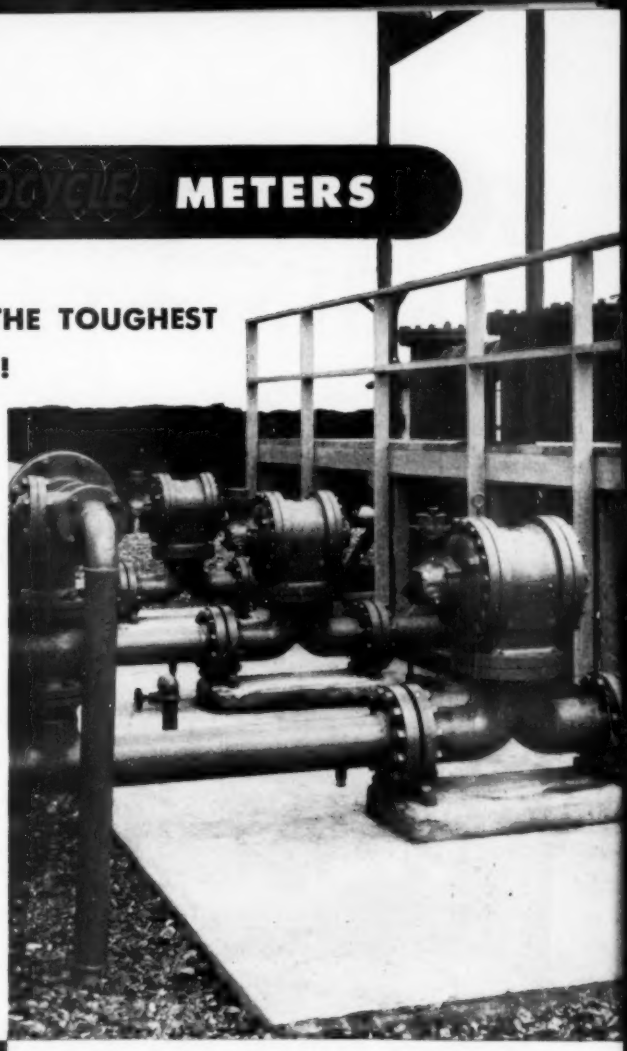
[Bulletin HE-7 describes typical installations of Vogt Film Type exchangers and is available upon request.]

HENRY VOGT MACHINE CO., LOUISVILLE, KY.

Branch Offices: NEW YORK, CHICAGO, CLEVELAND, DALLAS, PHILADELPHIA, ST. LOUIS, CHARLESTON, W. VA.

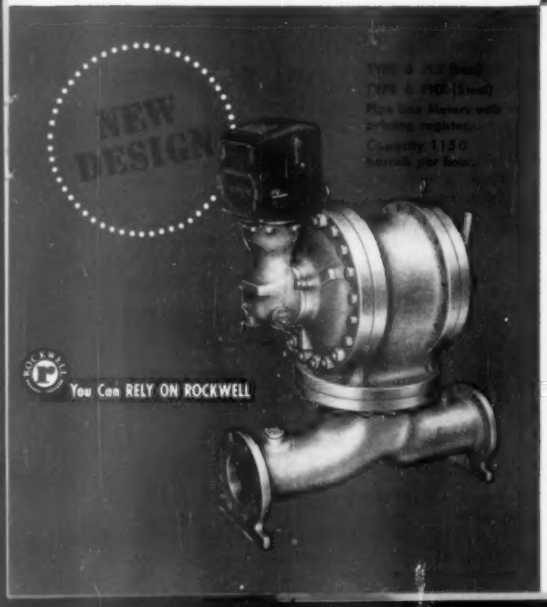
ROCKWELL ROTOCYCLE METERS

JOB PROVED ON THE TOUGHEST PRODUCT PIPE LINE SERVICES!



You'll find Rockwell Rotocycle meters faithfully serving at input and take off points on many of the nation's leading product pipe lines. These meters have established impressive durability records while accurately counting the barrels as they roll through the line.

Rockwell Rotocycle meters have the exclusive "Flo-ward" operating principle in which all moving parts revolve in the direction of the flow. No other meter runs so smoothly and freely—none offers less resistance to line flow. This means you can use smaller motors to drive your pumps. You can realize important savings in power.



NOW WE'VE MADE A GOOD METER *EVEN BETTER*

Rockwell engineers constantly seek new ways to make existing products better. Take for example, the improved PX series of Rotocycle Pipe Line meters. Here, a combination of better materials, stronger construction and newly designed anti-friction bearings make possible meters that will give even finer performance than those of the past.

Best of all, the PX series of improvements can be applied to meters already in service, right in the field, if desired, and at nominal cost and with minimum effort. Write us for full details.

ROCKWELL MANUFACTURING COMPANY

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Seattle • Tulsa

RIGHT AT THE BEGINNING--

plan to protect your pipe line against corrosion!

...include Bitumastic® Enamel in your original planning

ANY pipe line, whether large or small, is a big investment—an investment that should be properly protected.

That's why it's wise, when planning a new pipe line, to include Bitumastic Enamel in your design plans and specifications. Bitumastic Enamels, manufactured from selected coal-tar, have proved they can prevent corrosion. Many oil and gas pipe lines, laid 20 and 30 years ago, are still giving good service today, thanks to these durable Enamels.

Why not let your Koppers representative work with you from original planning through to final operations? He will be glad to assist you to get the most out of your protection dollar by giving you complete details and estimates.

KOPPERS BITUMASTIC ENAMELS

REG. U.S. PAT. OFF.

KOPPERS COMPANY, INC., Tar Products Division, Dept. 103-T, Pittsburgh 19, Pa.

DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALA.

Photo courtesy Tucker Sno-Cat Corporation, Medford, Oregon

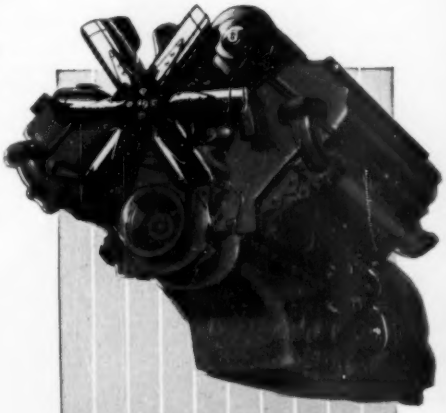
Snow, deep and powdery, on his favorite slope may be cause for rejoicing to the skier. But, to the men who must keep 60,000 volts of electricity crackling through ice-crusted lines in the high Sierras, to the men who must keep the lines of communication and transportation open to the West Coast . . . snow in any form spells possible trouble.

When the going is toughest, mountain men turn to their best friend, the Tucker Sno-Cat. These four-pontoon, full-track vehicles carry men and equipment *over the snow*—in minutes—to trouble spots it might otherwise take days to reach.

The 180 horsepower Model 20 Chrysler V-8 Industrial Engine gives the Sno-Cat extreme power without increase in weight, while Chrysler gyrol Fluid Drive and automatic transmission provide smoother, faster application of power to the double-drive axles. This combination is ideal for uses which require a powerful engine that will not stall under heavy loads and at the same time require an engine and transmission protected against the wear and tear of sudden starts and stops.

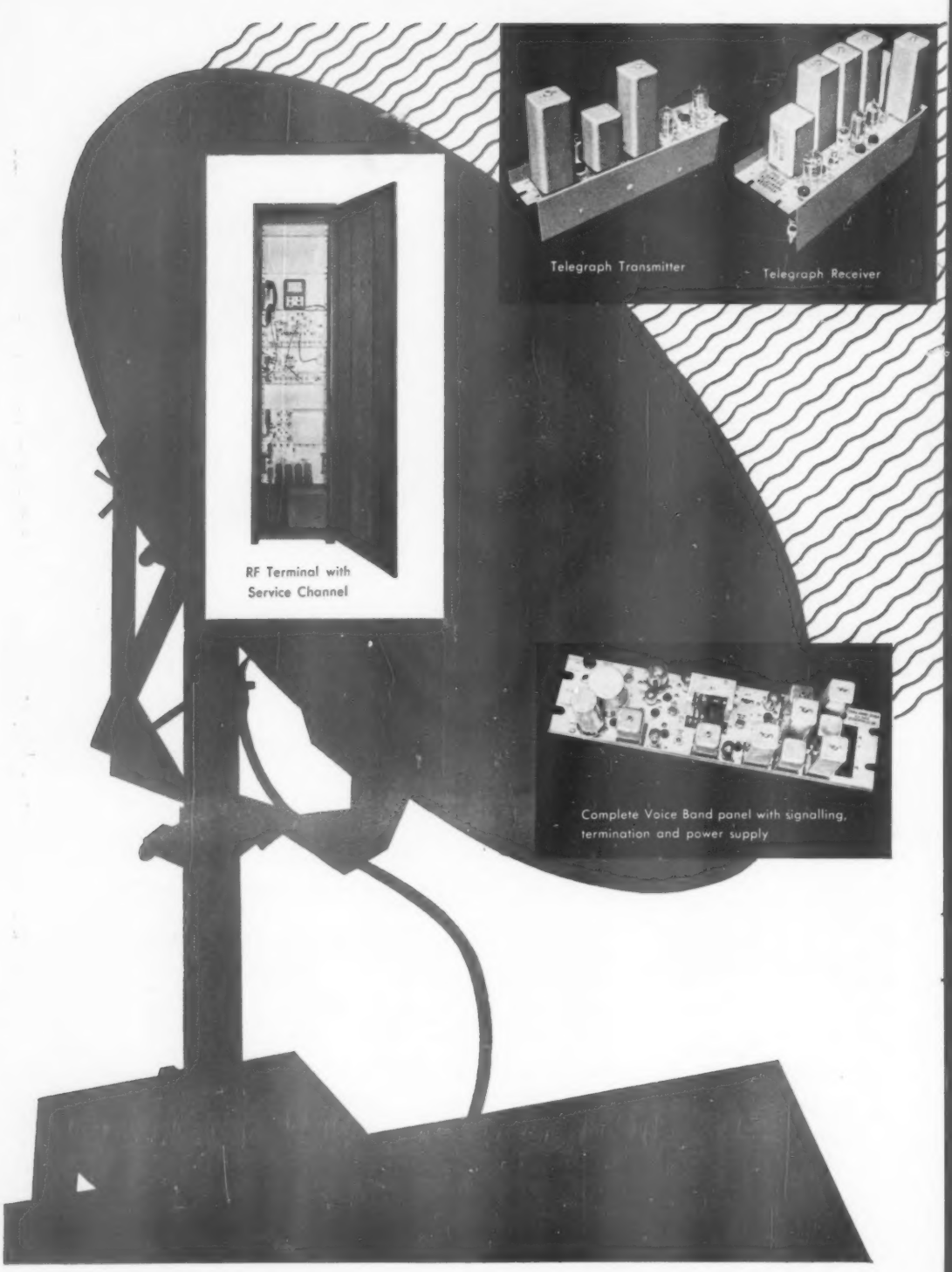
For greater power and economy in your equipment, check the two new Chrysler V-8 Industrial Engines as well as the seven six-cylinder models. See your Chrysler Industrial Engine Dealer for detailed information, or write: ***Dept. 151, Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.***

180 horses . . .
man's best friend
in the
wintry high Sierras



CHRYSLER
Industrial Engines

HORSEPOWER WIT.I A PEDIGREE


Telegraph Transmitter
Telegraph Receiver
RF Terminal with
Service Channel
Complete Voice Band panel with signalling,
termination and power supply

ANNOUNCING

THE NEW WESTINGHOUSE

2000 MC MICROWAVE SYSTEM

FOR:
- ✻TELEMETERING
- ✻VOICE COMMUNICATION
- ✻LOAD CONTROL
- ✻TELETYPE
- ✻REMOTE CONTROL
- ✻SUPERVISORY CONTROL
- ✻PROTECTIVE RELAYING
- ✻FACSIMILE TRANSMISSION

Whatever your communication needs may be, examine the new type FR Microwave radio and type FJ Multiplexing equipment.

Maximum transmission reliability plus compatibility with interconnected terminal equipment assures a dependable, trouble-free communication system.

Long experience in microwave equipment and design, and a thorough knowledge of your problems, have enabled Westinghouse to combine the best development of past and present systems in this new equipment. To meet all your communication requirements, Westinghouse offers these important plusses:

1. VERSATILE, WELL-INTEGRATED PACKAGE—The multiplexing equipment is designed specifically for operation with the radio equipment and with end equipment to insure a versatile, well-integrated package.

2. UP TO 30 VOICE CHANNELS—The type FR and FJ equipment provides 30 voice channels plus a service channel to satisfy all your communication requirements. Each voice channel may be used for up to 15 telegraphic functions.

3. MAXIMUM TRANSMISSION RELIABILITY—Operation at 2000 MC with ample reserve power assures dependable transmission under all conditions.

4. COMPLETE INDEPENDENCE OF INDIVIDUAL CHANNELS—Self-contained voice channel multiplexing equipment provides unmatched reliability of the individual functions. Only the radio equipment is common to all channels.

A COMPLETE SYSTEM: What's more, Westinghouse can deliver a complete Microwave communication system to you on a turn-key basis. All phases of design and construction, including surveys, installation, equipment, buildings and towers can be supplied.

Extensive Westinghouse facilities and experience as a manufacturer of all types of supervisory control, telemetering and relaying equipment make it possible to bring you a really complete, integrated system under a single responsibility.

If you are considering new or expanded communications, it will pay you to examine Westinghouse microwave radio. For complete information, call your nearest Westinghouse representative, or write at once to Westinghouse Electric Corporation, Carrier-Microwave Section, 2519 Wilkens Avenue, Baltimore 3, Maryland.

J-02253

YOU CAN BE SURE...IF IT'S Westinghouse

If you were not a customer of Iverson Stores during the past year, we both lost. We would like to correct that situation in 1953. Each Iverson store carries a large line of Drilling, Production and Refinery Equipment. It is staffed with efficient sales and service personnel desiring to meet you and ready and willing to assist you in every possible manner. Each store has the necessary pick-up trucks and field cars for fast delivery of quickly-needed parts or equipment. Visit your nearest Iverson store and get acquainted. If this is not practical, telephone or write for any needed information.

Iverson wants your business and assures you of the best possible service.

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DRILLING-PRODUCTION AND REFINERY EQUIPMENT
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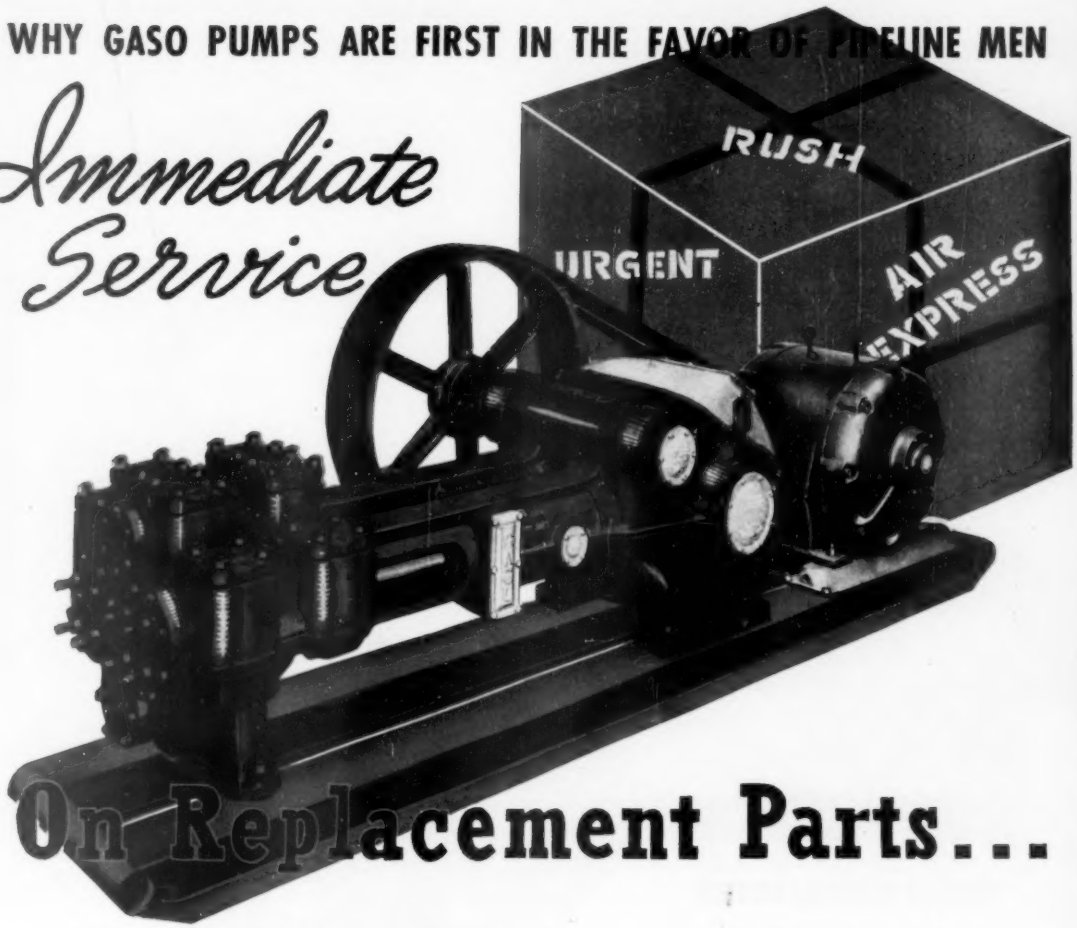
WHY GASO PUMPS ARE FIRST IN THE FAVOR OF PIPELINE MEN

Immediate Service



On Replacement Parts...

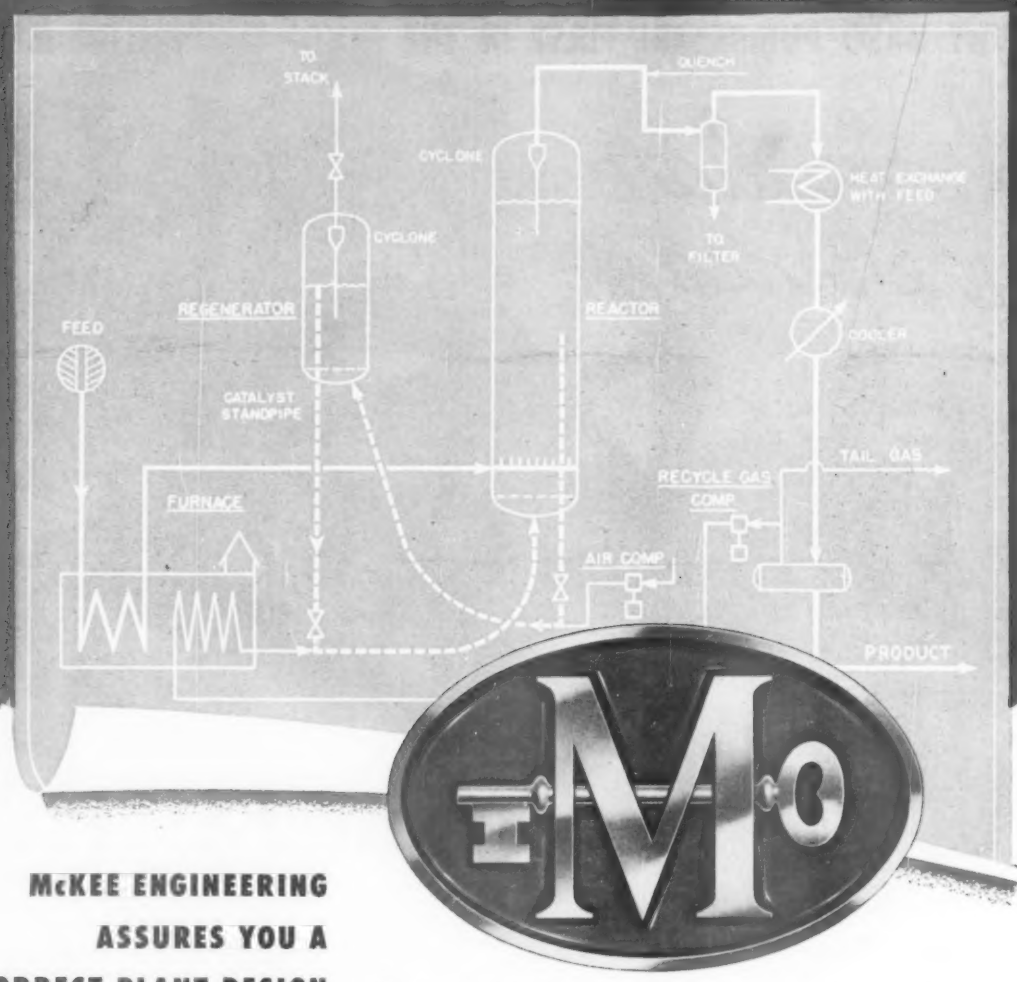
Let's face it—even Gaso Pumps may sometimes need a replacement part, especially when they have been operating long after the retirement age of ordinary pumps. But when it happens, Gaso users don't worry. They know that Gaso maintains stocks of parts for all standard models regardless of age, with a policy of immediate shipment by fastest possible route. May we send you a copy of our latest catalog?

GASO PUMP & BURNER MFG. CO. 902 EAST FIRST ST., TULSA, OKLA.
EXPORT OFFICE: 149 BROADWAY, NEW YORK

Shreveport: W. L. SOMNER CO., 419 Lake Street • Los Angeles: 2529 Chambers St., Vernon • Western Canada: Lufkin Machine Co., Ltd., Edmonton, Alberta

GASO PUMPS

for every oil industry need



McKEE ENGINEERING ASSURES YOU A CORRECT PLANT DESIGN FOR ANY PROCESS

● The object of all McKee refinery engineering is to provide facilities of such design as to obtain fullest advantage from the process involved. In a word, to get the *greatest yield of highest quality product at lowest cost.*

McKee Company's enlarged process engineering facilities, design, engineering, procurement and construction services are backed by a long, successful record of attaining this objective for refiners in every quarter of the globe.

These services are available to you to any extent you require them—from consultation to a turnkey job on a complete refinery.

DESIGN, ENGINEERING AND CONSTRUCTION FOR THE PETROLEUM REFINING AND IRON AND STEEL INDUSTRIES

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Arthur G. McKee & Company • Established 1905

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New York Office: 30 Rockefeller Plaza, New York 20, N.Y. • *Washington Office:* 1507 M Street, N. W. Washington, D. C. • *England:* The Iron and Steel Division of Arthur G. McKee & Company is represented by Head, Wrightson & Company, Ltd.
District Engineering Offices: Union, New Jersey and Tulsa, Oklahoma.

Past performance makes this amazing 14-month warranty possible

No ordinary pumping engine — only Le Roi A-288's unusual record of uninterrupted pumping service in actual installations — gives you this unprecedented warranty. Over 14 months (10,000 hours) of dependable pumping! Within that time you spend not one cent for repair parts — A-288 performance assures it — Le Roi guarantees it!

While other engines are ready for the replacement tag at 10,000 hours, the Le Roi A-288 is just nicely broken in — ready for thousands more hours of dependable service. One typical installation shows more than 47,000 hours with practically no downtime and still going strong — proof of sturdy stamina.

Just look at a few reasons for the A-288's dependability . . .

- Patented, closed "vaporizing-condensing" cooling system requires almost no make-up water — keeps temperatures uniformly high and prevents sludging even in sour gas areas.
- The A-288 is the only pumping engine to be recommended by one major user for continuous service *unattended for up to two weeks at a time.*
- Short, solid, properly counterbalanced crankshaft is 5" in diameter, has extreme overlap between crankpin and main bearing journals for added strength.
- No shut-down is required for inspection or adding oil.
- Heavily constructed and internally ribbed integral crankcase and base is rigid to resist distortion due to temperature differences or faulty mounting.

Send the coupon today for up-to-the-minute details on the new A-288 10,000 hour warranty. And take a look at the list of Le Roi distributors, an important cog in Le Roi's 3-way partnership, that means more efficient service to you.

LE ROI COMPANY

MILWAUKEE 14, WISCONSIN

Plants: **Milwaukee • Cleveland • Greenwich, Ohio**

Oil-field Headquarters: **Tulsa, Oklahoma**

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Carson Machine & Supply Co. — Oklahoma City

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North & West Texas, New Mexico
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Nortex Engine & Equipment Co.—Wichita Falls, Texas.

Kansas
Carson Machine and Supply Co.—Great Bend

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Western Machinery & Engine Company — Centralia, Illinois and St. Louis, Missouri.

Michigan
Hofer Engine Service — Reed City

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Gehring Equipment Co. — Casper, Wyoming, Rangeley, Col.

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Ingersoll Corporation — Shreveport, Lavisiana, Jackson, Mississippi, El Dorado, Arkansas

West Coast
Le Roi-Rix Machinery Co. — Los Angeles, Long Beach and Bakersfield, Calif.

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Lucey Export Ltd. — Calgary, Edmonton, Alberta.

Le Roi Company
302 N. Cincinnati Ave., Tulsa 3, Oklahoma

Gentlemen:
I don't believe it! Show me how you can afford to offer a warranty on this pumping engine and make it good for 10,000 hours — the equivalent of over 14 months operation — running 24 hours a day. Send the proof to:

Name..... Title.....

Company.....

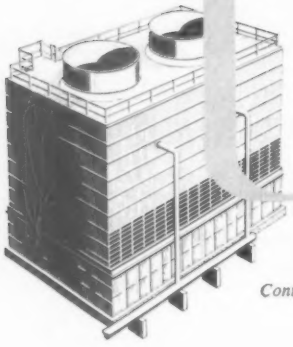
Address.....

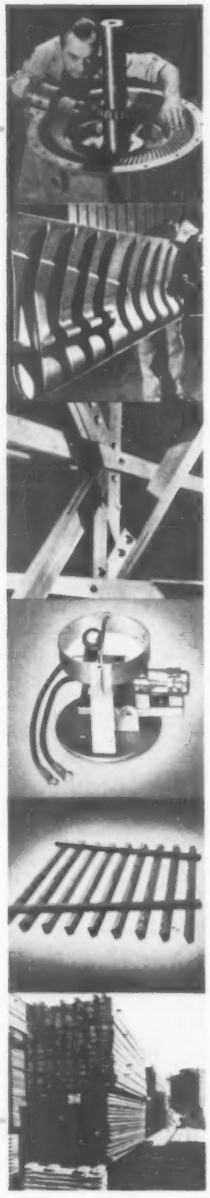
City..... Zone..... State.....

P-117

ONLY FLUOR

induced draft counterflo cooling towers provide these 6 exclusive features...





Spiral Bevel Gear Speed Reducers

Only Fluor-Western speed reducers incorporate curved tooth spiral bevel gears as standard design. This proven principle provides quieter, smoother, more efficient operation under the rugged conditions of cooling tower service. Other special design features include: oil-bath lubrication; dry air breather; chrome-plated shaft at oil seals; and, low-speed fan shaft mounted on special steep angle thrust and radial bearings to take combined gear thrust, fan thrust, and weight of fan assembly.

Unique Fan Blade Design

The Fluor Type HC Stainless Steel Fan blades, furnished as standard on every Fluor Counterflo Cooling Tower, are a joint development of The Fluor Corporation and Solar Aircraft Company. Designed specifically for induced draft cooling tower service, their unique air foil handles maximum air volumes at minimum tip speeds and horsepower requirements. Design *plus* mechanical arrangement eliminates recirculation of air and resulting power-consuming turbulence.

Internal Gusset Plate Construction

Fluor Counterflo Cooling Towers alone make full use of tensile as well as compressive strength of structural members! Their internal gusset plate design duplicates that used in wooden bridge construction. These simple, yet extremely strong joint connectors mean longer tower life, lower total tower weight, fewer and simpler castings, greater ease of erection, and minimum spoilage should the structure be dismantled, moved and re-erected.

Patented Vibration Cut-Out Switch

The Vibration Cut-Out Switch developed and patented by Fluor in 1944 protects tower structure and mechanical equipment by stopping the motor should excessive vibration suddenly occur. In addition to its value as an emergency safety device, the switch can be utilized by the operator as a positive "on-off" switch during routine inspection of tower structure and mechanical equipment. The motor cannot be started accidentally once the switch is placed in the "off" position.

Sloping-Bar Grid Decking

Exclusive Fluor-designed sloping-bar grid decks are of rough-finished 1" select redwood machine-nailed to 1" x 2" cleats—strong enough for use as scaffolding during erection, rugged enough to withstand the erosion of falling water. This means low maintenance and replacement cost. The sloping-bar design and arrangement of each deck cross member combines the advantages of maximum deck surface with minimum air pressure drop through tower.

Complete Prefabrication of Structure

Only Fluor Counterflo Cooling Towers are completely prefabricated. This offers many advantages to the operator. Tower parts are "packaged" for rapid delivery, marked for orderly erection. Erection is faster, easier, at lower cost. All cutting, drilling and nailing is completed at the factory. Prefabrication means standardization—low-cost replacement of standard parts that may become damaged over the years. It means uniformity in both performance and appearance.

Contact your nearest Fluor representative for detailed information. You Can Be Sure With Fluor

FLUOR

Engineers - Constructors - Manufacturers

THE FLUOR CORPORATION, LTD. • LOS ANGELES • HOUSTON

New York, Chicago, Pittsburgh, Boston, Tulsa, San Francisco, Birmingham and Calgary

Represented in the Sterling areas by:
Head Wrightson Processes Ltd., Teesdale House, Baltic Street, London, E.C.1, England

SINCE 1890

Century Motors Will Do a Reliable 3-Shift Job Every Day!

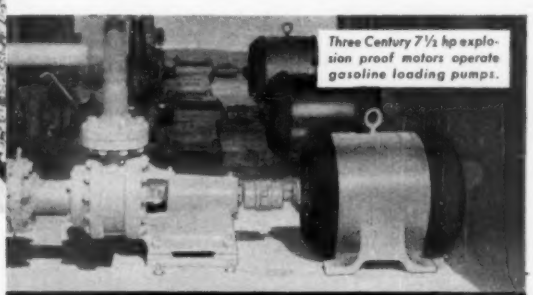
From the wide range of types and sizes you may select a variety of motor specifications for each job:

- ***Torques and current characteristics tailored to the job function.***
- ***Frame protection for a variety of hazardous surroundings.***

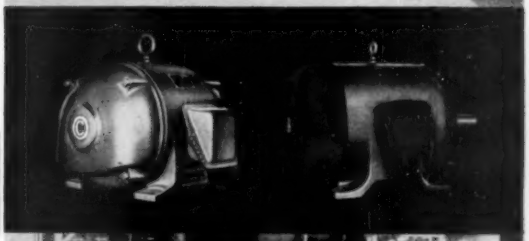
For Oil Production: Century Splash Proof Motors are widely used for pump rigs out in the open weather in any climate in the U. S. — Type SCT high torque, high slip, operating characteristics start stiff pumps and minimize shock reaction to pump parts by absorption.

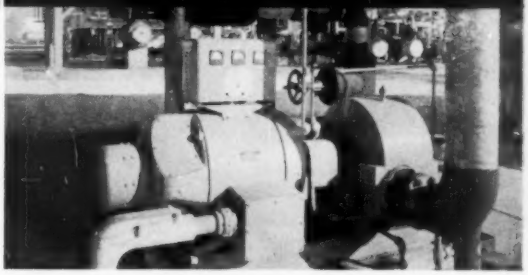
For Refining and Distribution: Century "Underwriters approved" Explosion Proof, Totally Enclosed Fan Cooled Motors, protect life and property in explosive atmospheres and are also offered in a variety of torque characteristics tailored to your job function.

Century 10 horsepower Splash Proof motor driving a pumping unit located in Texas.



Three Century 7½ hp explosion proof motors operate gasoline loading pumps.





Century motors are distributed in the oil fields through your regular equipment stores or through Century's 28 branch offices.

CENTURY ELECTRIC CO.

1806 Pine St. • St. Louis 3, Mo.

Offices and Stock Points in Principal Cities

Century C MOTORS

Century Type ARC Generator

Where public service current is not available, Century Generators will provide adequate, continuous electric power. Depending on the load per motor and the size of generator, from 10 to 30 wells can be operated from one generator. They provide a dependable source of oil field power.

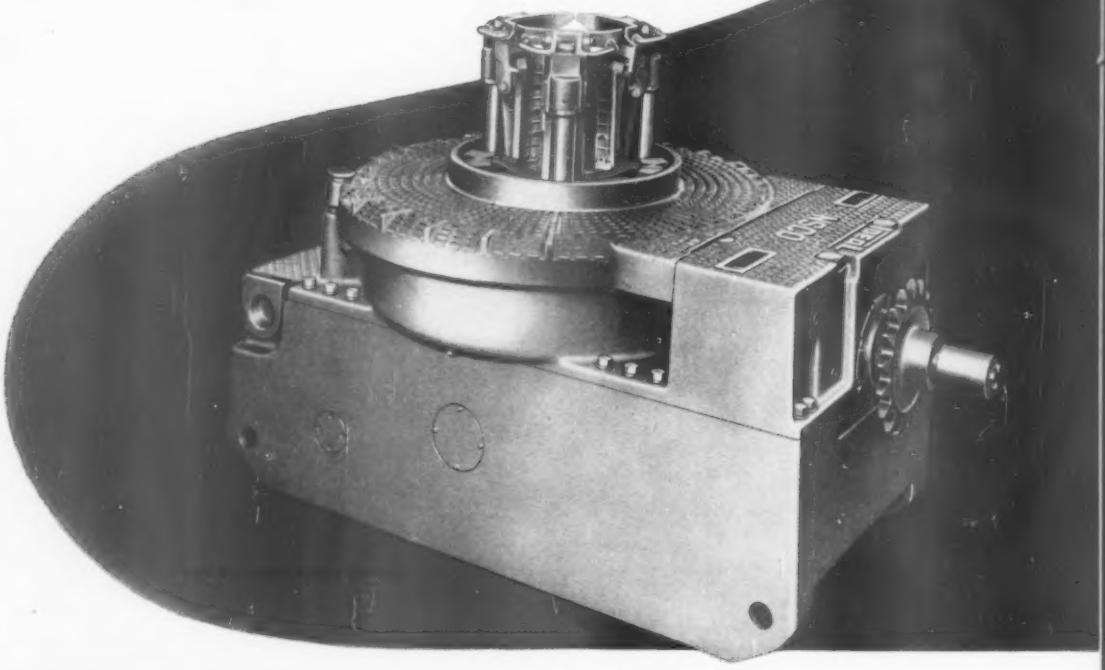
714

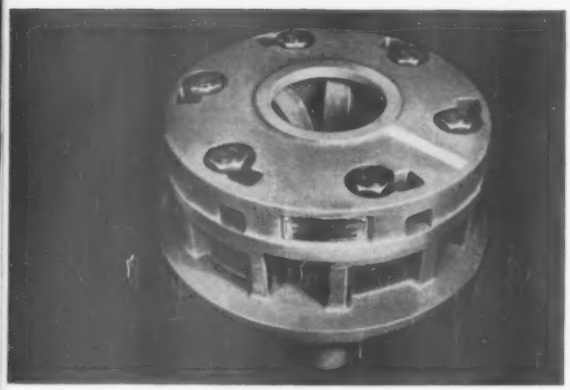
To Speed Up Drilling Operations,

To Cut Down Drilling Crew Fatigue,

To Run Drill Pipe or Casing Rapidly,

use IDEAL *MULTIMATIC ROTARIES*





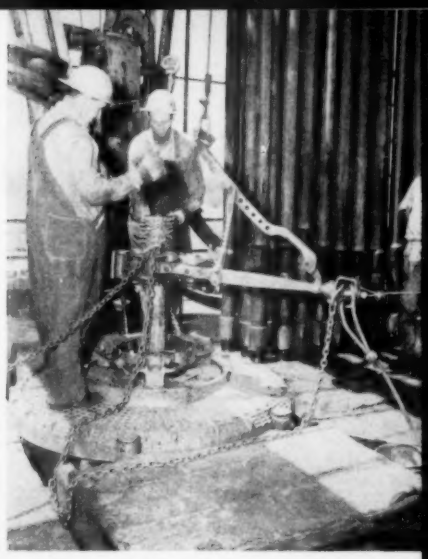
equipped with—

- **Air-actuated drill pipe and casing slips**
- **Fully-enclosed, built-in slip operating mechanism**
- **Direct-drive roller kelly bushing**
- **Positive seals against mud and water**
- **Non-skid-tread safety top**

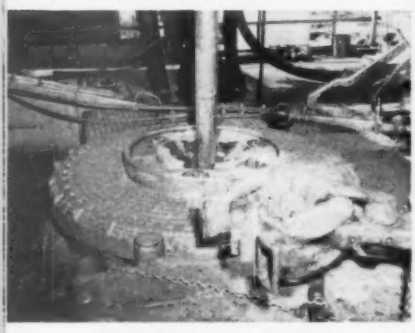
After two years of experimental operation, and continuous research and development, the new "Ideal" Type 205 Multimatic Rotary has performed satisfactorily under every drilling test imposed upon it.

These field tests of the "Ideal" Multimatic Rotary were conducted in several parts of the United States in actual drilling operations. As a result, this sequence of operating photographs was made while the rotary was in service.

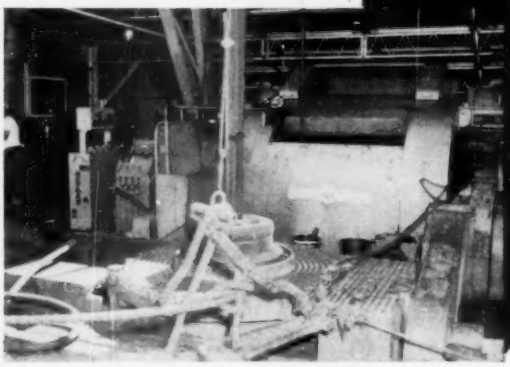
Slips retracted while drilling string is raised



Slips set, supporting drill pipe



Rotary machine with slips removed



Roller Kelly bushing in place and rotary operating

Here are some of the important features of the "Ideal" Multimatic Rotary which increase the speed, safety, and ease of rig floor operations—

- **Air operation of slips which makes easier work for the crew**
- **Faster slip action which permits quicker round trips and faster casing jobs**
- **Rotary handles both drill pipe and casing, with quick changeover from one to the other**
- **Casing can be set without removal of rotary machine which saves time and labor**
- **Control equipment permits quick adaptability of the rotary to any rig practice or procedure**
- **Roller kelly bushing driven directly from table thereby eliminating table master bushing**

These and many other features and construction details will soon be available in bulletin form. Write now so that we can place your name on the list to receive a copy.

THE NATIONAL SUPPLY COMPANY

PITTSBURGH 30, PENNSYLVANIA

DIVISION OFFICES: Casper • Ft. Worth • Houston • Pittsburgh • Tulsa • Torrance
CANADA: The National Supply Company, Ltd., 702 Barron Bldg., 610 Eighth Ave., West, Calgary, Alberta
EXPORT: 600 Fifth Ave., New York 20, N.Y., U.S.A.; River Plate House, 12 South Place, London, E. C. 2

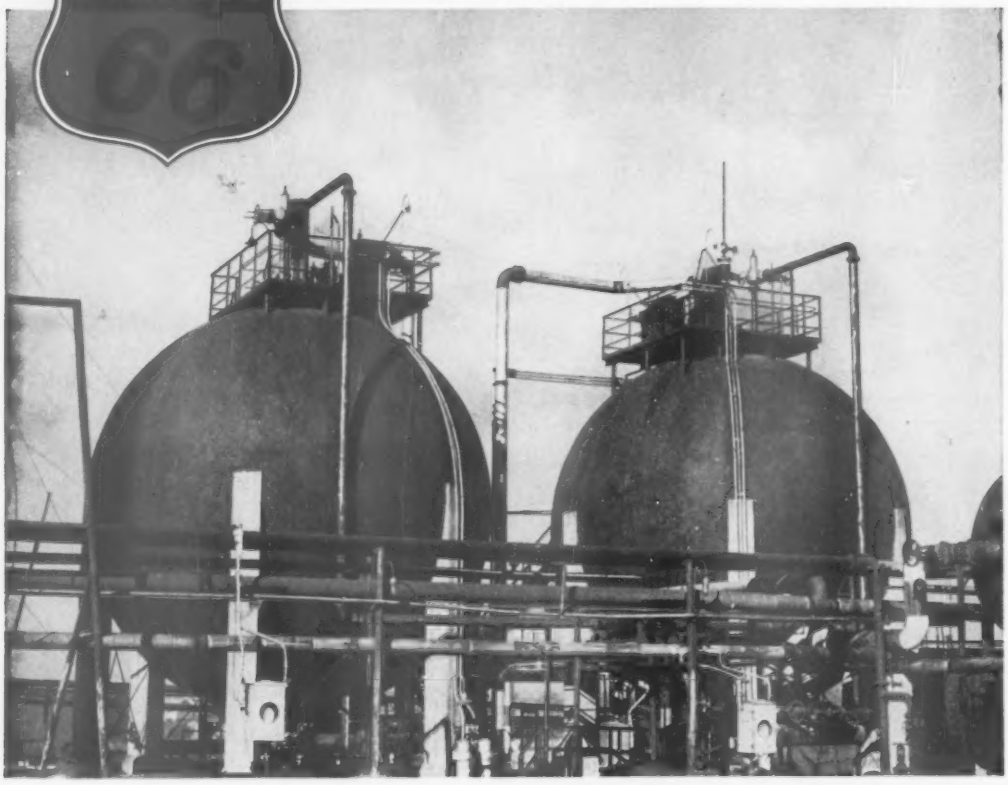
NATIONAL BLUE PRODUCTS

NATIONAL OIL FIELD MACHINERY AND EQUIPMENT

SPANG STEEL PIPE • SUPERIOR & ATLAS ENGINES

Phillips 66

another leading refiner who desalts with PETRECO



Phillips Petroleum Company has earned a place of leadership in the oil industry by manufacturing and marketing products of the highest quality. To consistently produce excellent products, a refining organization must possess and utilize a high degree of technological know-how.

One phase of Phillips know-how is their insistence on the absolute minimum of residual salt in the crude charge. Like other leading refiners, Phillips knows that salt in the crude charge, even in nominal tolerances, is a certain trouble-maker. The fact that Phillips utilizes Petreco Electrospheres at Phillips, Texas, to hold the salt content of the crude charge to this refinery to their required low minimum is of considerable significance.

Like other leading refiners everywhere, Phillips not only produces the best products possible–they help to assure this excellence of product by utilizing Petreco Desalting, the desalting process with an established reputation and known standards of performance and service.

Complete information on Petreco Electric Desalting and other refinery processes is yours for the asking.

PETROLITE CORPORATION
PETRECO DIVISION

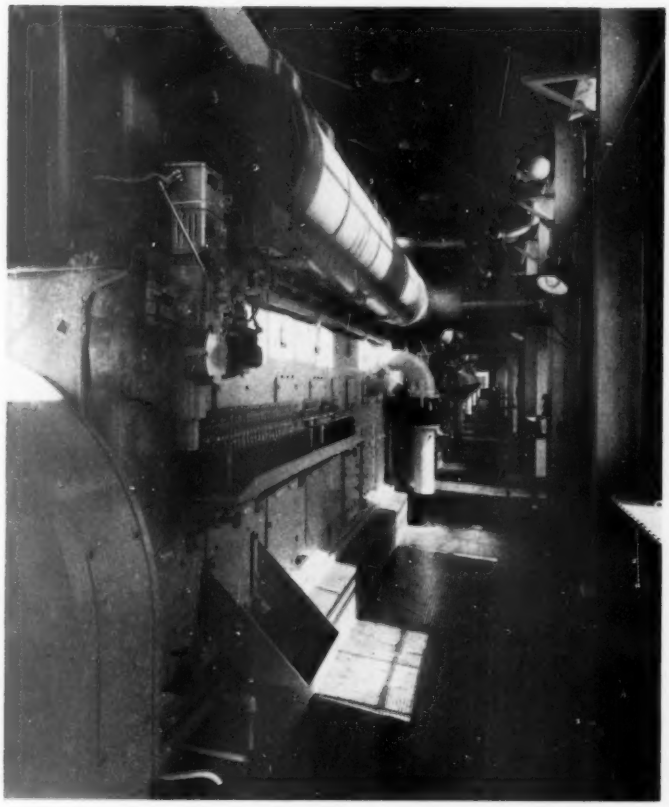
3202 S. WAYSIDE DRIVE, HOUSTON 1, TEX'S
1190 E. BURNETT ST., LONG BEACH 6, CALIF.

PETRECO

ELECTRIC PROCESSES FOR THE PURIFICATION OF PETROLEUM

CRUDE OIL: **REMOVAL OF SALTS, SOLIDS AND OTHER IMPURITIES; DEHYDRATING**
DISTILLATES: **ACID, CAUSTIC AND DOCTOR TREATING**
FUEL STOCKS: **DESAPONIFICATION**

Installation of Clark Bros. Co. Gas Engine Driven Compressors In Cycling Plant of Sun Oil Co.



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Marquette

HYDRAULIC GOVERNORS

The Marquette METAL PRODUCTS CO.
CLEVELAND 10, OHIO
SUBSIDIARY OF CURTISS-WRIGHT CORPORATION

Also Manufacturers of:
ROLLER BEARING TEXTILE SPINDLES
WINDSHIELD WIPERS FOR AIRCRAFT, TRUCKS AND BUSES
FUEL OIL PUMPS AND INJECTORS
PRECISION PARTS AND ASSEMBLIES

FOR DEPENDABLE PERFORMANCE

Specify WOLVERINE QUALITY-CONTROLLED CONDENSER TUBES

● Wolverine condenser tube is manufactured in standard diameters, wall thicknesses and lengths—and in a number of alloys. It is packaged carefully to give utmost protection during shipment and storage and for your convenience in handling at time of use—

PLAIN TUBE

In sizes from ⅝" to 2" O.D.

Wall thicknesses from .042" to .180".

Lengths up to 50 ft.

Alloys: copper, cupro-nickel, aluminum, brass, red brass, 70-30 brass, Muntz metal.

Tempers: All condenser tubing furnished in accordance with ASTM B-111 Specification or similar specifications.

FINNED TUBE

WOLVERINE TRUFIN*
—THE INTEGRAL FINNED TUBE

Furnished with plain ends to permit best assembly.

In nominal sizes from ⅜" to ¾"—root diameter.

Wall thicknesses from .032" to .065".

Alloys: copper, cupro-nickel, red brass, admiralty, aluminum, aluminum-brass, SAE 1010 steel, and stainless steel.

End treatments: *plain ends*, stripped, full-finned, or variations of these end treatments.

WOLVERINE TUBE DIVISION
of Calumet & Hecla, Inc.
Manufacturers of tubing exclusively
1459 Central Ave. • Detroit 9, Michigan

**REG. U.S. PAT. OFF.*

Wolverine Trufin and the Wolverine Spun End Process available in Canada thru the Unifin Tube Co., London, Ontario

PLANTS IN DETROIT, MICHIGAN AND DECATUR, ALABAMA
Sales Offices in Principal Cities

Export Department, 13 E. 40th St., New York 16, N. Y.

AND NOW
ELECTRIC WELDED STEEL TUBE
This new product will be made to the same high standards that have brought recognition to Wolverine as a supplier of high quality nonferrous tube.
Available in sizes from ¼" to 3" O.D. in choice of these analyses:
SAE 1010
SAE 1015
SAE 1020
SAE 1025
WOLVERINE TUBE DIVISION
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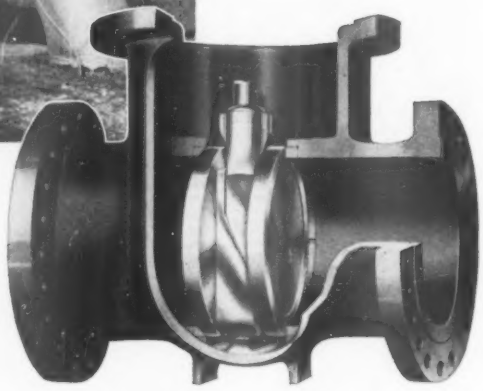
1459 CENTRAL AVE. • DETROIT 9, MICH.

PLANTS IN DETROIT, MICHIGAN AND DECATUR, ALABAMA
Sales Offices in Principal Cities

Export Department, 13 E. 40th St., New York 16, N. Y.

Darling 20" fully revolving double disc, parallel seat cast steel gate valves, with manually and motor-operated bevel gear, installed on a major line.



Darling cast steel pipe line gate valves

Rated tops at keeping out of trouble!

IT won't cost you a cent to find out *why* you stand to save plenty with Darling pipe line gate valves on the job. Aside from extra rugged, stress-proved construction throughout, it's Darling's unique fully revolving double disc, parallel seat principle that *really* pays off!

Take a close look at the cutaway view. The rugged, self-adjusting wedges *automatically* seat the fully revolving, no-pocket discs, assuring tight, easy closure. Coupled with uniform wear distribution, these valves do a better job and last longer with less attention, less maintenance.

If it's proof of performance you're after, check with some of Darling's pipe line users. Meanwhile, you are welcome to a descriptive bulletin giving *all* the money-saving facts. Darling gate valves are available in all pressures and various constructions for main line, gathering, manifold, tank farm and all other services.

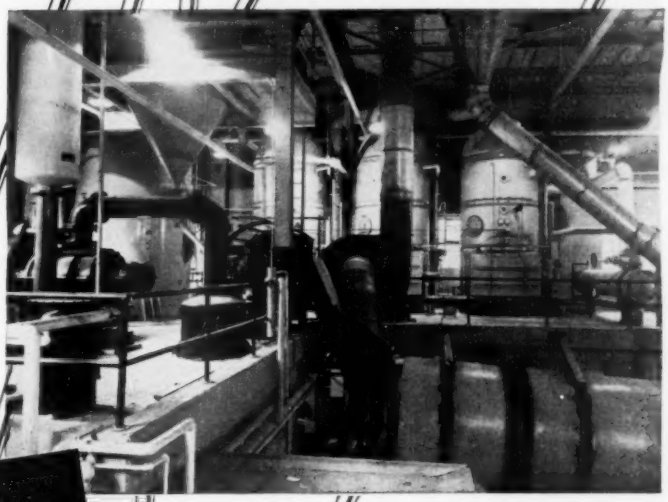
for plus values job-proved again and again

DARLING VALVE & MANUFACTURING CO.

Williamsport 1, Pa.

Manufactured in Canada by Sandilands Valve Manufacturing Co., Ltd., Galt 19, Ont.

This complete ferrous sulfate recovery plant is tubed with ELECTRUNITE Pressure Tubes.



HEAVY CHEMICALS

...another industry that cuts per-hour costs on heat exchangers with Republic

ELECTRUNITE PRESSURE TUBES

In this ferrous sulfate recovery plant, for example, evaporators, calandrias, dryers, and crystallizers are tubed with ELECTRUNITE Heat Exchanger Tubes. Throughout the chemical industries, ELECTRUNITE Pressure Tubes help keep dozens of processes on-stream longer between retubings. Production schedules are maintained; production costs are kept down.

ELECTRUNITE Pressure Tubes are uniform in ductility and corrosion resistance all-around and end-to-end. Full-normalizing assures clean scale-free surfaces.

Tell us what you process in your heat exchangers, condensers, and dryers. We'll gladly tell you which ELECTRUNITE Pressure Tubes, carbon or stainless, will do the best job for you.

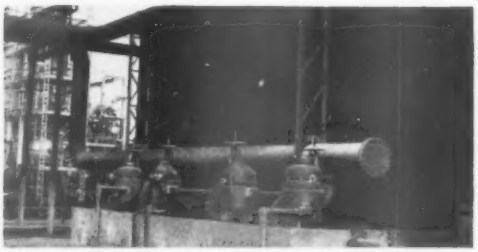
REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION
224 EAST 131st STREET • CLEVELAND 8, OHIO

Republic
REPUBLIC STEEL
ELECTRUNITE
BOILER, CONDENSER AND HEAT EXCHANGER TUBES

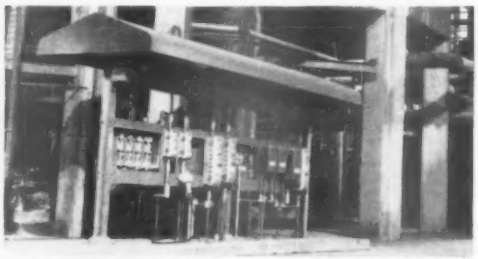
INCOMING POWER is controlled by this G-E metal-clad switchgear. Providing primary-circuit protection, these compact G-E units are factory-assembled to speed installation, metal-enclosed to provide maximum safety to personnel.

Refinery's power system helps

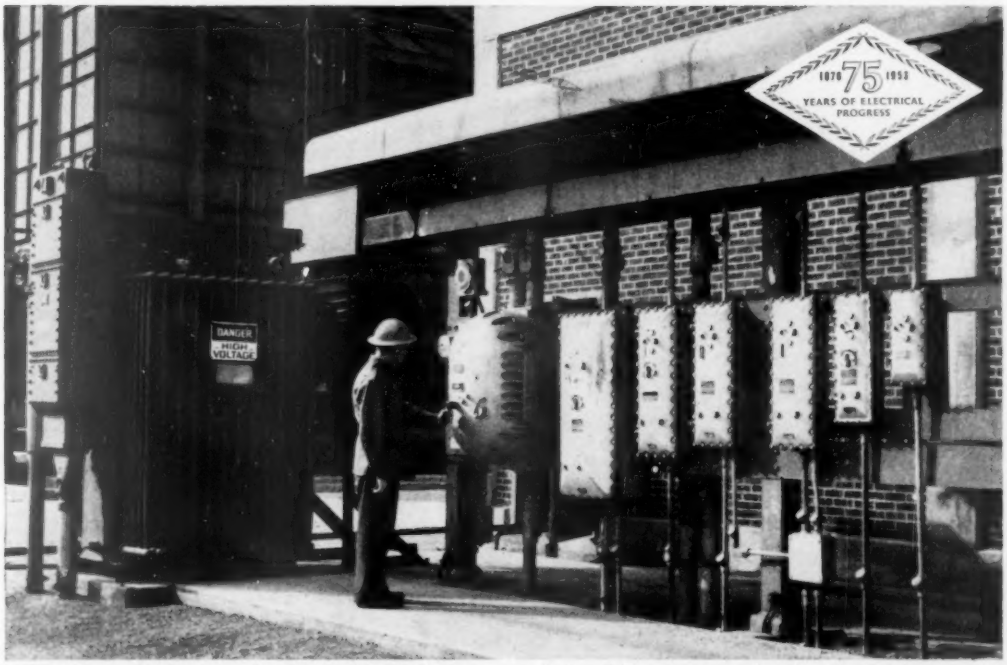
PLANT POWER FACTOR is improved by 360-kvar G-E capacitor equipment near a refinery-type load-center substation.



COOLING-WATER PUMPS, in non-hazardous location, are driven by four G-E vertical motors rated 150 hp, 440 volts.



IN HAZARDOUS LOCATION near catalytic cracking tower, explosion-proof enclosures help protect G-E motor starters.



HIGH VOLTAGE POWER is brought economically to load centers and stepped down at unit substations like this one, rated 1000 kva.

Racked-up G-E explosion-proof equipment includes manually operated master breaker and magnetic starters for plant motors.

maintain high-output continuity

G-E ENGINEERING uses modern facilities in designing improved equipment to give you greater continuity of power service. These engineers at the new G-E Switchgear Development Laboratory examine films of a typical switchgear test.

G-E engineered distribution system helps keep Phillips Petroleum Co., Phillips, Texas plant refining 80,000 bbl/day

In its refinery at Phillips near Borger, Texas, the Phillips Petroleum Company cracks and blends petroleum products at the rate of 80,000 barrels per day. Helping to maintain this output on a continuous basis is the plant's power distribution and drive equipment, co-ordinated by Phillips' and General Electric engineers to meet the plant's specific processing needs.

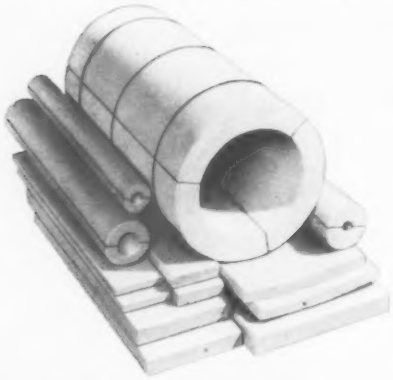
Here is one more in a long list of petroleum refineries that have profited by G-E engineering experience. Whatever *your* refinery's electrical needs, General Electric application engineers can help you or your consultants co-ordinate your electric equipment for maximum efficiency. For more information, contact your nearest G-E Apparatus Sales Office. General Electric Company, Schenectady 5, N. Y. 661-37

Engineered Electrical Systems for Petroleum Refineries

GENERAL ELECTRIC

How to Get the Most Out Of Your Insulating Dollars

The Right Material . . . Expert Application



First, Kaylo Heat Insulation is *proved* a *better* material—hydrous calcium silicate. Its light weight, strength, water-insolubility, low conductivity and wide temperature range give you extra advantages *at no extra cost.*

Second, Kaylo distributors have the technical knowledge and experience to provide you with a complete insulating service. Their trained applicators are skilled craftsmen who do neat and efficient installation.

To be *sure* of getting the most out of your insulating dollars for your next job, call the nearest Kaylo distributor. Chances are you can find him listed in the yellow pages of your phone book. If not contact us and we'll give you his name.

WRITE FOR FREE BOOK—"Kaylo Heat Insulation." Address: Dept. N-358, Owens-Illinois Glass Company, Kaylo Division, Toledo 1, Ohio.

KAYLO® ***. . . first in calcium silicate***

. . . pioneered by OWENS ILLINOIS **Glass Company**

MAIN OFFICE: TOLEDO 1, OHIO—KAYLO SALES OFFICES: ATLANTA • CHICAGO • HOUSTON • NEW YORK • PHILADELPHIA • PITTSBURGH • ST. LOUIS

ASK THE AEROFIN MAN

About Practical Heat Exchange

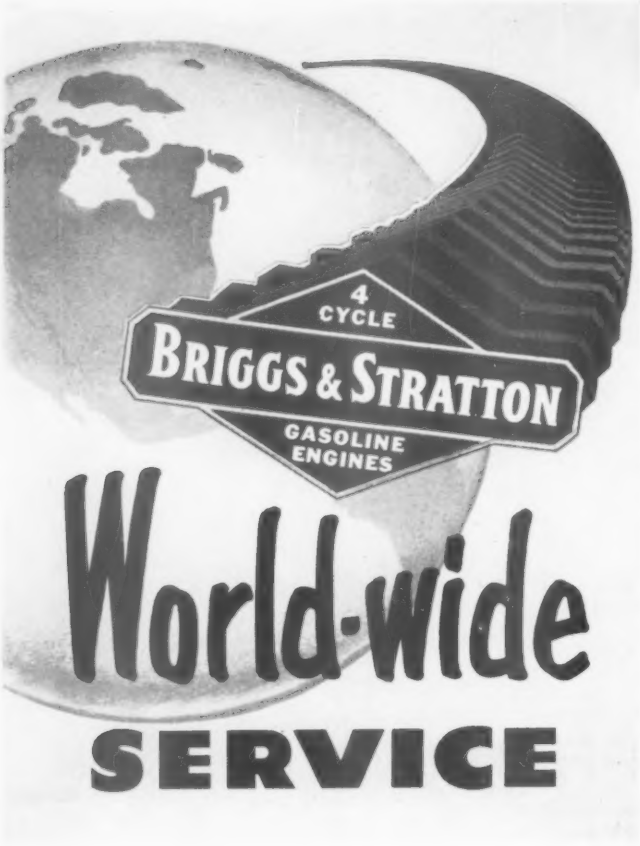
There is a competent Aerofin heat-transfer engineer near you—qualified by intensive training and long experience to find the *right* answer to your own particular heat-exchange problem—and backed by the research and production facilities of the pioneers in light-weight extended surface.

Ask the Aerofin Man.

Aerofin is sold only by manufacturers of nationally advertised fan system apparatus. List on request.

AEROFIN CORPORATION

410 South Geddes St., Syracuse 1, N. Y.



THE GREATEST SERVICE ORGANIZATION OF ITS KIND IN THE WORLD . . .

Near you there is a Briggs & Stratton service organization — factory trained and supervised — ready to tune up, repair, or even rebuild your Briggs & Stratton engines with *original* Briggs & Stratton parts.

If your Briggs & Stratton engines are not busy during these winter months, now is the ideal time to have them serviced — to insure continued peak performance for busy periods ahead.

Only Briggs & Stratton maintains such complete world-wide authorized service facilities — a big "plus" that you get only when you specify Briggs & Stratton engines on the gasoline powered equipment you buy.

Briggs & Stratton Corporation, Milwaukee 1, Wisconsin, U. S. A.

In the automotive field Briggs & Stratton is the recognized leader and world's largest producer of locks, keys and related equipment.

They Say—

Steel-Industry Outlook

"In the second half of 1953, steel-industry capacity—which will be in excess of 116 million ingot tons—should be fully adequate to meet the needs of defense and civilian users. This balancing of supply and demand does not indicate that we are entering a period of recession. Instead, I believe we shall be engaged in a normal and healthy state of competitive selling.

"Government regulations over the production and distribution of steel were in effect during the past year. The steel industry has expressed its conviction that these rigid controls are no longer needed and it has formally suggested a plan for decontrol to the National Production Authority. There is hope that elimination of current controls will proceed promptly in an orderly manner."

Benjamin F. Fairless, chairman of the board, United States Steel Corp., in a year-end statement.

Versatile Gas

"The versatility of natural gas as an industrial fuel and its controllability as a 'precision tool' are responsible for many new products and processes. Gas can actually substitute for critical materials. Striking examples are in the manufacture of seamless steel tubing, oil-well casing, and a large group of synthetics.

"In the manufacture of seamless steel tubing, new gas-fired equipment not only provides the fast, accurate heating and instant response to temperature-change demand which have long been needed by processors, but also serves as a precision tool to control and change tube sizes without the use of mechanical tools.

"The challenge of critical material shortages also has been met by modern gas engineering. In recent years, for instance, the petroleum industry has sought higher-strength casing to withstand the pressure of deeper wells. Casing specifications calling for a minimum yield strength of 80 lb. per sq. in. required the use of scarce manganese and molybdenum-alloy steel. By a carefully controlled gas heat-treating process, the needed specifications have been achieved with 'almost plain carbon steel' and a yield strength of 100,000 lb.

"As a result, a single installation of

MILESTONES IN CAMERON PROGRESS

They had bugs in their bonnets

—but they sired a new champion

Along with early models of blowout preventers, Christmas trees and other oilfield products that have helped to establish Cameron as the *world leader in pressure control,* ancestors of the Non-Lubricated Lift Plug Valve are also proudly displayed in our own private hall of fame.

Each of these predecessors made a worthwhile contribution to the unique valve which is proving itself the champion for all sorts of difficult services in petroleum, chemical and process industries.

C. I. W., Inc., P. O. Box 1212, Houston, Texas. Export: 7912 Empire State Bldg., New York, N. Y.

Cameron IRON WORKS, INC.

World Leader in Pressure Control

Now . . . 2 New
AO COVERGLAS GOGGLES
Fit Over Safety And Personal Glasses

NEW
Safety Goggles

#326

#327

NEW – 4 WAYS!

1. New Cup Size and Shape
2. New Lens Size and Shape
3. New Side Shields
4. New Easy Lens Replacement

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These goggles are the newest . . . and two of the greatest . . . developments since the advent of safety goggles. Get all the facts about these two outstanding Coverglas goggles from your AO Safety Products Representative. He can supply you.

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"There is no reason why this new role of gas cannot help conserve equally scarce copper and zinc in the manufacture of cartridge cases, guns, armor, and civilan goods."

Frederic O. Hess, past president of the Gas Appliance Manufacturers Association, addressing the American Society of Mechanical Engineers.

Imports Fears

"We have within the United States oil supplies equal our full requirements for the foreseeable future. To whatever extent this country is now or may become dependent upon outside sources for petroleum supplies is a matter of government policy.

"We have watched with concern the ease with which officials of our State Department, the Department of Commerce, and other agencies are interchangeable with officials of the importing companies. . . .

"An indication of how far government bureaus will go is the current statement by the chief of the fuels division of the Office of Price Stabilization that he has instructed his staff to study the possibilities for government subsidies for imported oil.

"We, as a part of an industry that has studied the question and given full appraisal to the harmful effects of excessive imports of oil on our industry, as well as the security of our country, have a clear course to follow.

"It should be our duty to advise fully with Congress to avoid the ill effects that would follow wholesale relaxing of import controls."

Russell B. Brown, general counsel, Independent Petroleum Association of America, speaking in Houston.

Government vs. Private Enterprise

"The United States Mint, one might imagine, is a pretty tough competitor. At least in the business of striking off medals. The fellows in Philadelphia, San Francisco, and Denver have turned out a big enough pile of coins to poke a hole through the ionosphere.

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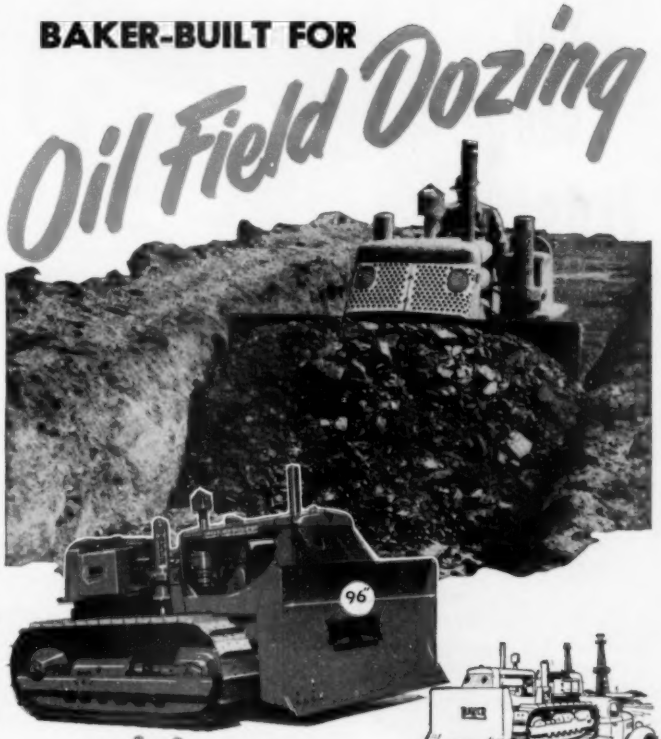
Oil Field Dozing



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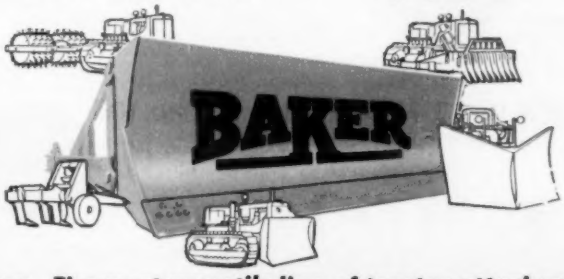

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not only higher, but Uncle Sam needed more time to do the job."

Business News Features, Chamber of Commerce of the United States.

CALENDAR OF EVENTS

JAN.

15 American Institute of Chemists and American Chemical Society, symposium on public relations for chemists and chemical engineers, Hotel Commodore, New York City.

16-17 Independent Petroleum Association of America executive committee, quarterly meeting, The Campbell House, Lexington, Ky.

19-21 Pipe Line Contractors Association, fifth annual convention and exhibit, Shamrock Hotel, Houston.

19-22 American Society of Mechanical Engineers, and Society for Advancement, Plant Maintenance Conference, Public Auditorium, Cleveland.

19-23 American Institute of Electrical Engineers, winter general meeting, Hotel Statler, New York.

21-23 Southwestern Legal Foundation, fourth annual Institute on the Law of Oil and Gas and Taxation, Dallas.

27-28 Kansas Oil Men's Association, annual convention, Hotel Lassen, Wichita.

28-30 Symposium on Instrumentation for the Process Industries, Agricultural and Mechanical College of Texas, College Station.

FEB.

2- 6 Corrosion short course, sponsored by National Association of Corrosion Engineers, University of California, Berkeley.

5- 7 Missouri Petroleum Association convention, President Hotel, St. Louis.

16-21 American Institute of Mining and Metallurgical Engineers, annual joint meeting of petroleum, metals, and mining branches, Statler Hotel, Los Angeles.

18 Instrument Society of America, sixth annual New York regional meeting, Hotel Statler, New York.

18-19 Pacific Coast Gas Association, technical services conference of technical section, Hollywood, Calif.

27 Natural Gasoline Association of America, regional meeting, Scharbauer Hotel, Midland, Tex.

MAR.

2- 6 American Society for Testing Materials, spring meeting, Statler Hotel, Detroit.

4- 6 American Petroleum Institute, division of production, Southwestern district spring meeting, Hilton Hotel, Fort Worth.

8-11 American Institute of Chemical Engineers, Buena Vista Hotel, Biloxi, Miss.

15-20 American Chemical Society, petroleum division, spring meeting, Statler Hotel, Los Angeles.

16-20 National Association of Corrosion En-

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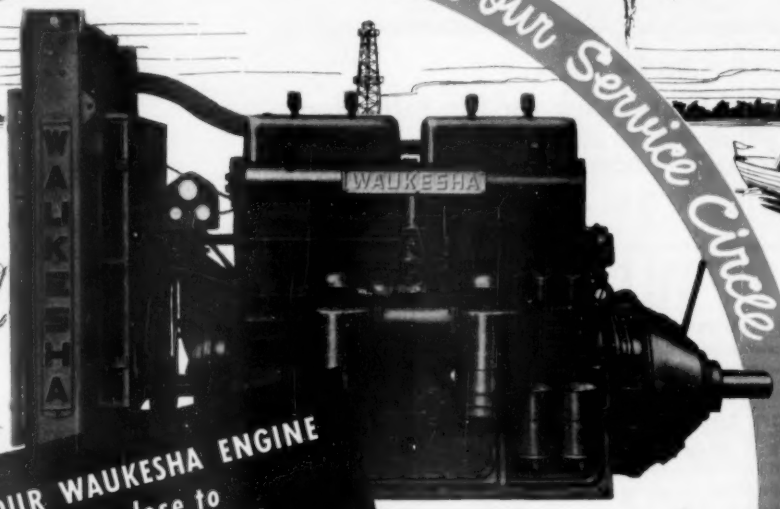

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gineers, ninth annual conference and exhibition, Hotel Sherman, Chicago.

18-20 American Petroleum Institute, division of production, Mid-Continent district meeting Mayo Hotel, Tulsa.

23-25 Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, Tex.

23-26 American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, and Society of Exploration Geophysicists, joint annual meeting, Sam Houston Coliseum, Houston.

30-31 Texas Independent Producers and Royalty Owners Association, annual meeting, San Antonio.

30-Apr. 1 Mid-West Gas Association, Broadmoor Hotel, Colorado Springs, Colo.

APR.

7- 9 Petroleum Industry Electrical Association, annual convention and exhibit, Shamrock Hotel, Houston.

8-10 American Petroleum Institute, division of production, Eastern district meeting, William Penn Hotel, Pittsburgh.

15-17 National Petroleum Association, midyear meeting, Cleveland.

21 Association of Consulting Chemists and Chemical Engineers, Inc., Hotel Belmont Plaza, New York City, symposium and dinner.

21-23 Southwestern Gas Measurement Short Course, University of Oklahoma, Norman.

24-25 Interstate Oil Compact Commission, 1953 spring meeting, Roosevelt Hotel, New Orleans.

26-29 American Institute of Chemical Engineers, Chemical Institute of Canada, joint meeting, Royal York Hotel, Toronto, Ont.

27-28 Independent Petroleum Association of America, mid-year meeting, Jefferson Hotel, St. Louis.

Apr. 29-May 1 Natural Gasoline Association of America, annual convention, Rice Hotel, Houston.

Apr. 30-May 1 American Gas Association, transmission and storage conference, Edgewater Beach Hotel, Chicago.

MAY

4- 5 American Petroleum Institute, division of marketing, midyear meeting, Baker Hotel, Dallas.

7- 8 American Petroleum Institute, Rocky Mountain district, Division of Production, spring meeting, Gladstone Hotel, Casper.

11-13 Southern Gas Association, Jung Hotel, Hotel, New Orleans.

11-14 American Petroleum Institute, Division of Refining, midyear meeting, New York.

13-14 Pacific Coast Gas Association, annual gas supply and transmission conference, Santa Barbara, Calif.

14-23 International Petroleum Exposition, Tulsa.

15-16 International Gas Union, council meeting, Paris, France.

24-27 American Gas Association, production and chemical conference, Hotel New Yorker, New York City.

28-29 Natural Gas and Petroleum Association of Canada, London, Ont.

JUNE

2- 3 American Petroleum Institute, Division of Production, Pacific Coast District, Statler Hotel, Los Angeles.

One of these

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After setting the Duo-Pak, you can apply pressure either above or below it to test the casing and be sure of getting the packer out of the hole.

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LOW TUBING LOAD!
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All materials, except stem, used in the Duo-Pak can be easily and quickly drilled out in case of extreme emergency.

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PS-3

PS-2

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TULSA, OKLAHOMA

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JOURNALLY Speaking

No Back Seat

THE Desk and Derrick girls thought we were sarcastic, or maybe jealous, when we kiddingly remarked that they were getting so active that it appeared they were trying to climb right up in the driver's seat of the oil industry.

Quite a few of the ladies wrote in to protest that they don't want to drive; they just want to know where they are going. We greatly fear that they'll get sore all over again if we make any cracks about back-seat drivers, but we'll risk a weak pun to the effect that the girls are showing plenty of drive and aren't taking a back seat to anybody when it comes to the business of living in oil.

To illustrate, here are a couple of instances of where the Desk and Derrick girls have come up with bright ideas and taken the initiative in putting them across—but without trying to crowd the men out of the act.

Show Girls

AS everybody knows by now, there will be a big oil show in Tulsa May 14-23, the International Petroleum Exposition. A lot of oil men will be present, and so will quite a few oil women—thanks to the Tulsa Desk and Derrick Club.

When the I.P.E. officials asked the girls to help they scratched their heads (figuratively, of course — they didn't want to muss their permanents) and in practically no time at all they had launched a nation-wide essay contest on the subject: "Why My Boss Should Send Me to the Oil Show."

Ironically, the girl who makes the most convincing argument won't have to use it on her boss, because the prize is a free trip to the show, all expenses paid. (Tulsa girls aren't eligible).

But we have a strong suspicion that a lot of the runners up will develop such powerful reasoning that their bosses won't have any alternative but give in and send them. So you can expect to see quite a bevy of D&D girls at the show, and those in charge of equipment exhibits had better be primed for some pretty intensive and piercing, if nontechnical, questioning about the uses and functioning of their gadgets.

Incidentally, we wouldn't be surprised to see some of the menfolk borrow the girls' arguments to harry the poor boss into sending them, too. Never underestimate the power of a woman.

Brains vs. Beauty

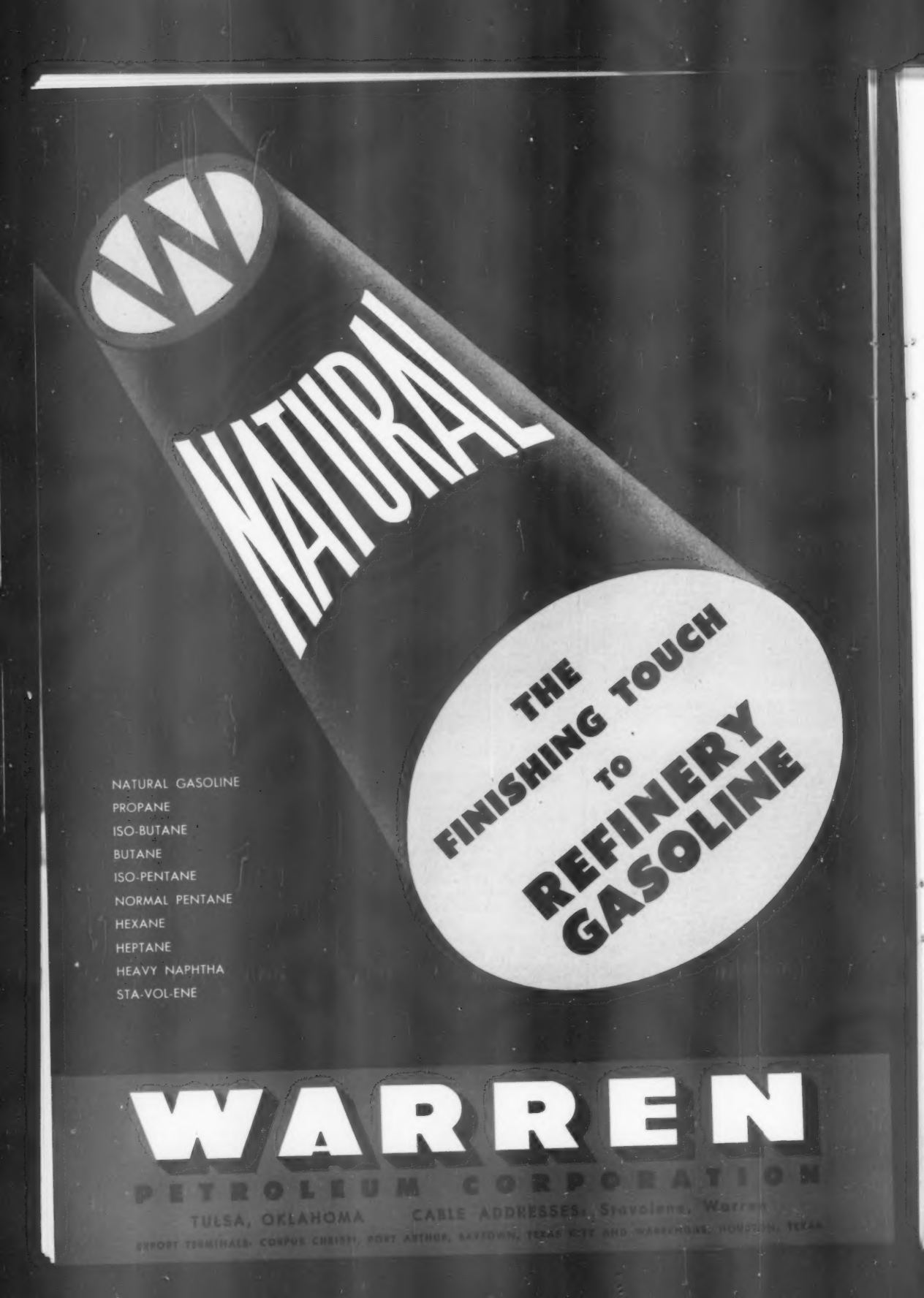
THE oil show is not only going to play to a lot of oil women next May, but one of them is going to be in the cast. The I.P.E. is going to present a scroll and a pin to "The Oil Woman of the Year."

This is another idea of the Tulsa D&D girls, and all the chapters of the Desk and Derrick Clubs of North America have been asked to submit nominations for this honor. Women engaged in any branch of the oil industry will be considered by the judging committee, and candidates are to be judged on the basis of some outstanding position in or contribution to the industry.

This participation of women in the International Petroleum Exposition is quite different from that of a quarter of a century ago. The first oil shows were something like county fairs, or fiestas, and made much of beauty contests and fancy floats. Miss Smackover, Miss Rodessa, Miss Spindletop, and other pulchritudinous representatives of active oil areas would parade around on decorated conveyances and vie for popular votes to be crowned as Miss Petroleum, or Miss Oil Show, or some such.

All that sort of stuff is out, now. The oil show itself is an industrial exhibition for technical operating men who come to look at mechanical equipment and study performance figures. And the oil women present will not be there because of their good looks—though they'll have that, of course—but because they are now a real part of the operations of the oil industry.

Henry D. Ralph.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If wide spacing cuts costs it is properly conservation

THE widest well spacing ever ordered for an oil field is now the rule in the Spraberry trend—one well to 80 acres with the option of 160-acre drilling units.

This raises a fundamental question: Can wide spacing be justified in the name of conservation?

The Texas Railroad Commission issued the order on evidence that the Spraberry sand has such low productivity that 40-acre spacing is uneconomic and that wider spacing will produce just as much oil.

There was no evidence that 40-acre spacing caused physical waste of oil or that 80-acre spacing will give greater ultimate recovery. On that basis one member challenged the commission's authority to base a spacing order on financial considerations.

THERE are engineers who say that most oil reservoirs could be drained effectively by just one well—the absolute ultimate in wide spacing. If the time element is no consideration, the most economic spacing is the widest that will ultimately produce all recoverable oil.

There is no question that the basic authority of regulatory commissions is to prevent physical waste and promote maximum ultimate recovery. But commissions must be practical, and they have some obligations to the public and to the operators.

Whether or not it is expressly set forth in the statutes, conservation authorities have an obligation to assure adequate supplies of oil at reasonable prices. Therefore, within limits, they should consider drilling and production costs. It is difficult to justify a rule which increases the cost of oil without increasing its quantity.

NO commission, of course, can get very far away from physical conservation without running into trouble. It should never let its orders place an economic umbrella over producers' profits, nor become a crutch for financially inefficient methods, nor—above all—impair the incentive to develop techniques of greater recovery. If wide spacing has this tendency it should be reconsidered.

But if wide spacing will produce the same—even though no greater—quantity of oil as close spacing, and will produce it within a reasonable time and at lower cost per barrel, a wide-spacing order seems fully justified as an adjunct of conservation.

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. . . **Interstate and Foreign Commerce:** Interstate oil compacts and petroleum and natural gas except on the public lands; regulation of interstate and foreign transportation except transportation by water.

. . . **Judiciary:** Protection of trade and commerce against unlawful restraints and monopolies.

. . . **Merchant Marine and Fisheries:** Measures relating to the regulation of common carriers by water; inspection and regulation of merchant-marine vessels; registering and licensing of vessels.

. . . **Public Works:** Oil and other pollution of navigable waters.

. . . **Ways and Means:** Reciprocal-trade agreements; revenue measures generally; social security.

Tidelands Move Rumored

Reports that President contemplates declaring submerged oil lands as naval petroleum reserves stir new Congress

WASHINGTON. — A reported plan of President Truman to declare the whole tidelands oil area as naval petroleum reserves created the first furor in the new Congress last week.

The proposed order would be based on allegations of the necessities of the national defense. If issued, it would inject entirely new factors into the tidelands situation just as it appeared about to be finally settled.

At the White House the only response to inquiries about the matter was a terse "No comment." But it is understood that the Interior Department disapproved of nationalization of the offshore oil reserves and the Navy, while it did not formally go on record, also has no ambitions to take over additional reserves.

An order issued by President Truman could, of course, be rescinded by his successor, and Democratic members of Congress from the three coastal oil states which are fighting for return of their tidelands made it clear they would go along with the new President if he took that course.

With the disclosure that the order, originally written 5 years ago after the first Supreme Court decision in the tidelands cases, might be issued within the next few days, members of Congress were quick to charge that President Truman, who has called efforts to return the tidelands to the states a $100,000,000,000 oil "steal," would be engaging in a "steal" of his own.

Politics alleged . . . "Obviously the dusting off of this discarded scheme is for political effect and not for reasons of conservation or national defense," Rep. Samuel W. Yorty of California asserted.

"The tidelands claimants who have filed on valuable producing offshore oil lands and who assert a right to take them over as political war booty are most anxious, for technical legal reasons, to see the proposed order issued," Yorty said. "Their filings are based on the theory that the offshore fields are public lands within the meaning of the federal leasing law under which they are trying to assert their fantastic claims. The Interior Department has ruled that the offshore areas are not such public lands. But naval petroleum reserves are cut out of public lands."

The alleged plan to take over the offshore fields by this new approach was first disclosed by Sen. Arthur V. Watkins of Utah. Although the Naval Petroleum Reserves Act authorizes the President to set aside oil-bearing areas for national defense, Watkins expressed "grave doubt" as a lawyer as to the President's legal authority to stretch that law to cover the submerged lands.

Drawbacks . . . Even if the order was issued, members of Congress pointed out it still would be necessary to get authority and appropriations to carry out federal management or development. They predicted confidently such legislation could not be enacted.

Meanwhile, a new attempt to prevent or at least delay return of the tidelands to the states was launched by Sen. Estes Kefauver of Tennessee. With the cosponsorship of seven other senators, three of them Republicans, Kefauver introduced a bill to create a nine-member commission to study the issue, including boundary problems, the question of equities of the states, individuals or communities, and programs for developing the submerged oil resources. The study, he said, also should consider the possibility of using the revenues from the offshore lands for reduction of the national debt and for education.

Pipe-Trade Rules Liberalized

WASHINGTON. — Freedom of oil and gas operators to make trades or exchanges of oil-country tubular goods and line pipe was broadened last week by the National Production Authority to cover also deals involving foreign-made goods.

Authority for such transactions was provided through amendments to the two NPA priority orders M-46 and M-46A at the request of the Petroleum Administration for Defense. Previously, such trades or exchanges had been permitted on an individual basis and only after approval by PAD.

Putting trades for foreign goods on the same basis as exchanges of domestic tubular goods and line pipe, NPA

Old Flame Still Burns in the Peace River Area

An old Canadian gas well still burns after having been abandoned 17 years ago. In the background the combination railroad and automobile bridge leading into the Peace River area of northern Alberta, where an active search for natural gas is under way. (Cities Service photo by Fritz Henle.)

WATCHING WASHINGTON

Bertram F. Linz

Alarm Over Avgas

The aviation-gasoline situation continues to be one of the toughest problems of the whole mobilization program.

Retiring Mobilization Director Henry H. Fowler, in his final report to the President, admitted that so far no satisfactory plan has been developed for getting the required expansion of production in the face of the probability of a rapidly dwindling market within the next few years.

The manner in which Fowler discussed avgas was seen by some as an intimation that ways of getting additional facilities other than by voluntary action by refiners might have to be resorted to. Since the contracts offered by the Armed Services Procurement Agency to builders of new plants have not been particularly effective, this might mean government construction—something the administration has shied away from so far.

Predicting that high-octane avgas will probably continue in tight supply for another 18 months, Fowler said the gap between demand and supply of normal-cost avgas can now be filled largely by the blending of higher-cost ingredients diverted from other uses, but it is clear that this and other expedients, even though pressed to the limit, would not meet the wartime needs for aviation gasoline.

The only answer, Fowler said, is more production capacity. But one of the factors making the problem difficult is the probability that in less than a decade the continued shift from piston to jet engines for military aircraft will wipe out a substantial portion of the requirements of intervening years.

Yet in the meantime, he pointed out, we must be prepared to meet military requirements on time and in full.

Disagreement Over Steel

Although they have been working at it for a year, the Petroleum Administration for Defense and the Defense Production Administration haven't yet been able to agree on fundamentals on which the allocation of steel for the oil and gas industry depend.

The matter is in no sense a controversy, and an interagency group is meeting currently in an effort to reach a basis of agreement, but there is a difference of opinion between the two offices which must be ironed out.

Each agency has one point in question. DPA questions the figures on requirements submitted by PAD. PAD, in turn, questions DPA's figures on steel-industry capacity for tubular goods. DPA believes the requirements estimated by PAD are too high, but PAD officials are laying their detailed figures before the study group and are confident they can support their estimates to the last ton.

The matter goes somewhat further than a disagreement. PAD believes it is necessary for the steel producers to recognize the growing potential market in the oil industry if they are to take steps to increase tubular goods capacity adequately. Once the true picture of oil-industry requirements and steel-industry capacity is laid out, they believe the steel produceers will be in a position to figure the expansion needed and, they hope, to start it.

Harmony Over Controls

Small business, oil and other, isn't getting a square deal from the Government.

That, in substance, is the purport of a 310-page final report submitted to the House of Representatives by its special committee on small business which has been studying the problems of the little man for the past 2 years.

The report, unanimously approved by Republican as well as Democratic members of the committee, holds that thousands of small firms suffered hardship because of the ineffective operation and the philosophy of control of the price and wage emergency agencies.

The committee called for the removal of all controls, expressing confidence that the lifting of price restrictions would not result in price rises. But if there was fear that inflation would follow, it suggested the President could be given authority to impose temporary price and wage freezes should an inflationary crisis develop.

established specific conditions for such deals.

Each party in the trade or exchange must either have the materials or hold an authorized controlled materials order for their purchase that has been accepted by a steel producer or distributor; the trade or exchange must involve substantially equal tonnages of materials; delivery must be completed within 30 days if they are in the parties' possession or within 30 days after receipt under an authorized materials order; both parties to the transaction must keep a written memorandum of it for at least 3 years.

Foreign-made material received by an operator in a trade will be subject to all the conditions on inventory and use that would apply if the material were domestically produced. Neither operator may further exchange the material without specific approval from PAD.

Records Agreement

State Department to try for "cartel" data abroad

WASHINGTON.—Negotiations with foreign governments for the release of documents called for by the Department of Justice for its grand jury investigation of alleged international-oil cartel activities will be undertaken by the State Department rather than by the companies involved.

Department officials have held several meetings with company representatives and have agreed that the matter is one for official action.

In an order last month, Federal District Judge James R. Kirkland ruled that the companies must make an effort in good faith to secure the permission of foreign governments for submission of documents held abroad and are to report by February 2 on the success of their efforts. He did not specifically require that the effort be made by the companies directly and is not believed to have any objection to having the matter handled through diplomatic channels. Justice Department officials sat in on the State-industry conferences and their presence was taken as an indication that they, too, would not oppose the plan.

Records deadline . . . With the State Department undertaking negotiations it is probable that the companies will not be able to make reports by February 2, but they still are required to submit their domestic records to the grand jury by January 12.

Whether the department will be able to do better than the companies might

is problematical. The United Kingdom and the Netherlands already have announced they will not permit the submission of records, and a number of other countries have indicated they will adopt a similar position.

Oil Agencies' Budget

Truman asks some increase for synthetic fuels, more money for FTC and Bureau of Mines, less for Navy oil reserves

WASHINGTON.—President Truman sent his final budget to Congress last week with only a slight increase in the proposed appropriation for the synthetic liquid-fuels program.

For the fiscal year beginning next July 1 the budget carried a total of $7,905,304 for the synthetic-fuels program of the Bureau of Mines. The estimate for the current fiscal year is $7,630,304, and actual expenditures in fiscal 1952 were $7,292,375.

The President's budget was submitted in accordance with law, but he pointed out it represented only the views of the present administration and not of the incoming regime, which undoubtedly will recommend substantial changes.

Because of the impending change in administration, the President made no recommendations for legislation in either his annual message or the message accompanying the budget.

Accordingly, a new and expanded program of synthetic liquid-fuels research which it was disclosed late last year is being worked out will have to be submitted for scrutiny by the new administration before it can be sent to Congress.

In other funds carried in the budget:

... **The Interior Department** would be given $187,000 for enforcement of the Connally Hot Oil Act, $3,000 more than appropriated for this year.

No funds are provided for the Oil and Gas Division, which currently is operating as part of the Petroleum Administration for Defense. Funds for PAD and other emergency agencies will be included in a supplemental appropriation to be made when Congress decides whether to continue the present mobilization structure and, if so, in what form. Estimated cost of PAD for this year is $1,794,125.

... **The Bureau of Land Management** is in the budget for $750,000 for handling the leasing and disposal of mineral resources, an increase of $132,000 over this year. The bureau is expected to dispose of 44,300 cases this fiscal year and to start 1954 with a backlog of 24,000. It estimated it will receive 52,500 cases during the year and dispose of 53,000, reducing the backlog by only 500.

... **The U. S. Geological Survey** is carried for $6,750,000 for geologic and mineral resource surveys and mapping, an increase of $940,000, and for $1,200,000 for supervision of mining and oil and gas leases, an increase of $120,000.

... **The Bureau of Mines** is given a total appropriation of $20,500,000, an increase of $1,343,000. In addition to funds for synthetic-liquid fuels, the bureau would receive $1,518,356 for its work with petroleum and natural gas, an increase of $175,000, and $90,795 for helium, the same as for this year.

... **Naval Petroleum Reserves** are provided a total outlay of $13,150,000 for 1954, covering the cost of maintaining the reserves and for conducting the exploration program in Alaska. The figure is a reduction of $9,972,000 from this year.

Of the amount proposed, $9,700,000 would be earmarked for exploration in Naval Petroleum Reserve No. 4, for which $9,872,521 was provided for this year. The over-all total includes a new item of $25,000 for administration of the naval oil-shale reserve, which currently involves only custody and minor surveys.

The big cut would be in funds for Reserve No. 1 (Elk Hills), on which $12,693,000 is being spent this year, which is to receive only $2,430,000, indicating that the program for increasing the capacity of the reserve is nearing completion.

Naval Reserve No. 2 at Buena Vista Hills is entirely under lease and requires no direct appropriation. Reserve No. 3 (Teapot Dome) is being explored by test wells to determine the recoverable oil in the deeper zones and would be given $830,000, an increase of $430,000 over this year.

... **The Federal Power Commission** is listed for an increase of approximately $465,000 in over-all funds, of which $340,000 would be in the fund for regulation and surveys of the natural-gas industry. A total of $1,865,300 would be provided for this work against $1,525,260 this year. The FPC is currently regulating 155 natural-gas companies with estimated operating revenues of $2,300,000,000 and next year is expected to have under its control 160 companies with operating revenues of $2,600,000,000.

... **The Federal Trade Commission** is also down for a substantial increase in over-all allowance, from $4,178,800 to $5,500,000, and its fund for economic and financial reports such as the oil cartel report issued last year will be more than doubled, from $226,390 to $488,495.

Oil Achievements Cited

PAD reports shortage-plagued industry set new drilling record, added greatly to plants and pipe lines in 1952

WASHINGTON. — The oil industry did a good job in 1952, despite the steel strike and shortages of materials.

Adding up the results of the year's work, the Petroleum Administration for Defense placed the number of wells drilled at 46,000, a new record approximately 1,500 higher than in 1951. While about 4,000 wells short of the 50,000-well goal, the deficiency was due the inability to secure material rather than any cutting back of effort, and it was in this division that the industry was affected most seriously by the steel strike.

Other achievements were a gain of about 400,000 bbl. daily in basic refining capacity; completion of facilities for 10,000 bbl. daily of alkylate; and increases of 7,000 miles in crude and products pipe-line facilities, 50,000,000 bbl. in crude and products-storage capacity, and 85,000 bbl. daily in capacity for producing natural-gas liquids.

At the close of the year, PAD estimated, basic refining capacity was 7,800,000 bbl. daily; there were approximately 170,000 miles of pipe lines, storage capacity was 1,130,000,000 bbl.; and producing capacity for natural-gas liquids was 896,000 bbl. daily.

Summarizing its own activities, PAD reported that during the year it allocated steel as follows:

Production . . . "A" operators received 160,089 tons of casing and tubing in the first quarter, 139,080 tons in the second quarter, 133,350 tons in the third quarter, and 18,453 tons in the

fourth quarter. The allocations to "B" operators for the four quarters were, respectively, 243,155 tons, 293,842 tons, 284,338 tons, and 51,401 tons. Sulfur and brine wells, service wells, etc., received quarterly allotments of 6,100 tons, 5,087 tons, 3,994 tons, and none in the fourth quarter. During each quarter, 22,000 tons of casing and tubing was set aside in field stocks for emergency uses, chiefly by wildcatters. The quarterly drill-pipe allocations were 20,228 tons, 22,698 tons, 23,687 tons, and 2,672 tons.

Transportation . . . Large crude lines received 259,510 tons, 218,864 tons, 101,018 tons, and 97,471 tons during four quarters; large products lines, 34,662 tons, 29,620 tons, 126,267 tons, and 79,948 tons; miscellaneous oil projects, 20,777 tons, 32,097 tons, 44,466 tons, and 28,250 tons; large natural-gas lines, 143,150 tons, 174,520 tons, 169,600 tons, and 136,800 tons; miscellaneous gas projects, 183,500 tons, 132,908 tons, 214,800 tons, and 167,567 tons.

Construction . . . Since its establishment, PAD has approved construction projects amounting on November 28 to $5,282,737,365. These including 2,730 projects for gas facilities, 976 for refining, 1,099 for pipe lines and storage, 513 for natural gasoline production or processing, 181 for marketing, and 139 for production. The total value of the projects was listed as $2,297,198,369 for gas, $1,458,649,378 for refining, $1,117,122,190 for pipe lines and storage, $330,274,246 for natural gasoline, $23,705,930 for marketing, and $55,787,252 for production.

Certificates . . . A total of 1,169 applications for certificates of necessity for accelerated amortization of expansion projects to cost $3,275,939,000 also was approved by PAD up to November 28.

These projects are designed to increase the capacities for basic refining by 1,412,000 bbl. daily, natural-gas processing by 196,000 bbl. daily, lubricating-oil production by 7,000 bbl. daily, lube-oil additives production by 11,000,000 lb. a month, cracking catalyst by 13,000 tons a month, sulfur by 422,000 long tons a year, crude and product storage by 65,059,000 bbl., natural-gasoline storage by 2,950,000 bbl., and crude and product pipe lines by 13,794 miles.

With 139 applications still pending, the agency had approved 301 refining projects to cost $1,214,943,000; 387 storage and transportation projects to cost $890,004,000; 22 gas transmission, distribution, and other projects to cost $415,560,000; 123 alkylation, aromatics, and tetraethyl lead projects to cost $229,872,000; 172 natural-gasoline projects to cost $255,324,000; 32 petrochemical projects to cost $147,622,000; 33 projects for lubricating oil and additives to cost $66,322,000; 14 projects for cracking catalyst to cost $28,097,000; 38 sulfur projects to cost $20,272,000; and 6 projects for oil-field equipment to cost $7,883,000. A total of 202 applications were denied, including one for production and two for marketing facilities.

NPA Orders Revoked

WASHINGTON. — The National Production Authority has revoked four orders covering the allocation of materials to the domestic and foreign oil and gas industries which were issued last summer as a result of the steel strike.

The revoked orders were directions 1 and 4 to M-46 and 1 and 2 to M-46A. One set extended the validity of third-quarter authorizations for oil-country tubular goods through the remainder of the year and the other set required that shipments of controlled materials made later than 7 days after the end of the quarter for which they were scheduled had to be charged against allotments for the next quarter.

Boundary Problem

Who should establish them is a question, report says

WASHINGTON.—Further study of the seaward boundaries of the United States should be undertaken by Congress before any effort is made to enact legislation establishing boundary lines, in the view of a special House subcommittee which studied the subject last year.

In its final report, the subcommittee, headed by Rep. Clair Engle of California, said a new committee should be set up this year and given adequate funds for the employment of experts to assist "in resolving the complex economic, legal and policy questions involved."

The report pointed out that no exact determination of our seaward boundaries ever has been made, but it points out the question never arose in serious form until the federal Government initiated its efforts to take over the oil and gas resources of the marginal sea outside the low-water line of the states.

The subcommittee found a division of opinion as to whether the setting of seaward boundaries is "justiciable," that is, to be decided by the courts, or "political," to be decided by the Government.

A.P.I. REFINERY REPORT, JANUARY 3

(Thousands of barrels)

District—	Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.	Stocks‡—Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, January 1952—Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.
East Coast	1,134	458.8	49.7	268.7	257.7	31,480	12,393	37,172	12,851	966	387.9	48.6	244.9	248.4
Appalachian:														
District 1	106	45.3	6.6	16.7	14.3	3,958	480	1,658	630	108	48.3	5.3	18.1	15.1
District 2	94	47.6	6.0	15.0	15.1	1,932	327	588	226	85	40.1	5.8	13.6	18.6
Ind., Ill., Ky.	1,338	693.3	94.1	255.0	201.9	29,754	5,960	18,090	5,136	1,272	648.3	90.9	240.0	187.6
Okla., Kans., Mo.	566	337.3	12.0	137.4	55.6	14,730	1,541	11,343	1,504	529	299.1	17.4	129.0	67.1
Inland Texas	283	193.7	11.0	45.0	42.0	5,654	470	1,905	1,041	241	163.7	13.5	35.7	40.2
Texas Gulf Coast	1,775	875.3	158.2	447.4	283.8	19,133	2,654	11,997	7,108	1,651	752.4	148.7	408.5	260.8
La. Gulf Coast	553	263.6	73.3	125.6	67.7	7,406	2,108	4,089	1,853	515	218.1	68.1	122.6	62.4
N. La. and Ark.	87	34.7	8.4	22.3	5.9	2,855	600	772	174	78	33.9	8.7	18.9	7.4
Rocky Mountain:														
New Mexico	15	9.3		2.3	3.4	166		62	38	17	10.4	0.6	2.5	4.0
Other Rocky Mtn.	231	115.1	5.0	51.0	44.9	4,930	369	1,816	1,000	232	109.1	8.4	48.6	51.0
California	1,039	398.3	0.7	178.6	368.3	15,018	364	10,969	17,898	946	382.4	4.6	174.3	375.6
Jan. 3, 1953	7,221	3,472.3	425.0	1,565.0	1,360.6	137,016	27,266	100,461	49,459	6,640	3,093.7	420.6	1,456.2	1,338.2
Dec. 27, 1952	7,077	3,431.9	436.3	1,574.9	1,236.1	134,425	27,790	103,685	48,662					
Jan. 5, 1952	6,803	3,193.4	409.3	1,496.9	1,371.1	135,344	26,417	84,996	43,158					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines. (Since the A.P.I. report for December 27 was not available in time for last week's book, figures for that week are shown on page 174. The above data are from the current report.)

Demand to Increase

Total demand of 8,000,000 bbl. daily seen by Bureau of Mines for 1953; crude production to rise only 1 per cent

TOTAL demand for crude and petroleum products will average 8,000,000 bbl. daily in 1953, according to the year-end forecast of the Bureau of Mines, released as a part of the monthly petroleum forecast of crude demand.

The total for 1953 represents an increase of 3.8 per cent over 1952. Domestic demand is projected at 7,646,000 bbl. daily for a gain of 4.9 per cent. Exports are expected to drop about 16 per cent to an average of 354,000 bbl. daily for the year.

The gains for domestic demand include increases of 5.5 per cent for gasoline, 4.1 per cent for kerosine, 7.7 per cent for distillate, and 2.5 per cent for residual.

New supply . . . The required new supply for the year does not show as large an increase as demand since the forecast does not call for any increase in stocks for 1953, compared with additions to storage of 41,500,000 bbl. in 1952. Also, the gain in imports is forecast at about 9 per cent, and production of light oils is expected to be up about 5 per cent, both greater than the over-all demand increase. The result is an increase in crude production of only slightly more than 1 per cent.

The forecast of crude runs to stills calls for an average of 6,863,000 bbl. daily for the year or a gain of about 3 per cent.

UNITED STATES SUPPLY AND DEMAND, ALL OILS
(Millions of barrels)

	Estimate 1952	Actual* 1951	1953 Forecast First quarter	Second quarter	Third quarter	Fourth quarter	Year
Production	**2,513.5**	**2,450.2**	**634.0**	**622.0**	**634.0**	**651.0**	**2,541.0**
Crude	2,292.0	2,244.5	576.0	566.0	577.0	591.0	2,310.0
Other oils	221.5	205.7	58.0	56.0	57.0	60.0	231.0
Imports	**349.0**	**307.8**	**98.0**	**92.0**	**88.0**	**101.0**	**379.0**
Crude	211.0	179.1	57.0	58.0	59.0	60.0	234.0
Refined	138.0	128.7	41.0	34.0	29.0	41.0	145.0
New supply	**2,862.5**	**2,758.0**	**732.0**	**714.0**	**722.0**	**752.0**	**2,920.0**
Change stocks	**41.5**	**37.0**	**—35.0**	**29.0**	**35.0**	**—29.0**	
Crude	21.0	7.3					
Products	20.5	29.7	—35.0	29.0	35.0	—29.0	
Total demand	**2,821.0**	**2,721.0**	**767.0**	**685.0**	**687.0**	**781.0**	**2,920.0**
Motor fuel	1,187.0	1,128.3	275.0	324.0	332.0	313.0	1,244.0
Residual	581.0	592.9	166.0	136.0	126.0	157.0	585.0
Distillate	514.0	470.0	184.0	101.0	93.0	164.0	542.0
Kerosine	133.0	130.1	47.0	22.0	22.0	45.0	136.0
All other	406.0	399.7	95.0	102.0	114.0	102.0	413.0
Exports	**154.0**	**154.4**	**35.0**	**35.0**	**31.0**	**28.0**	**129.0**
Crude	25.5	28.6	6.0	6.0	5.0	5.0	22.0
Refined	128.5	125.8	29.0	29.0	26.0	23.0	107.0
Domestic demand	**2,667.0**	**2,566.6**	**732.0**	**650.0**	**656.0**	**753.0**	**2,791.0**
Motor fuel	1,154.0	1,088.0	267.0	316.0	325.0	306.0	1,214.0
Residual	552.0	563.8	160.0	130.0	121.0	153.0	564.0
Distillate	482.0	447.3	178.0	94.0	87.0	159.0	518.0
Kerosine	125.0	123.3	45.0	20.5	20.5	44.0	130.0
All other	354.0	344.2	82.0	89.5	102.5	91.0	365.0
Daily averages (thousands of barrels)							
Total production	6,867	6,713	7,044	6,835	6,892	7,076	6,962
Imports	954	843	1,089	1,011	956	1,098	1,038
Change in stocks	113	101	—389	319	381	—315	
Total demand	7,708	7,455	8,522	7,527	7,467	8,489	8,000
Exports	421	423	389	384	337	304	353
Domestic demand	7,287	7,032	8,133	7,143	7,130	8,185	7,647
Runs to stills	6,664	6,494	6,920	6,750	6,810	6,972	6,863
Demand domestic crude	6,213	6,121	6,400	6,220	6,272	6,424	6,329

*New basis to compare with 1952.

Index Ready Now

The Oil and Gas Journal's index of material published during 1952 is just off the presses and is available now without cost to all Journal subscribers.

To obtain your copy, write today to the Circulation Manager, The Oil and Gas Journal, Box 1260, Tulsa.

This separate publication gives issue and page references of feature articles and news stories for all of 1952, by both subject and author.

1952 figures . . . The bureau's estimate for 1952, based on 10 months actual and 2 months current data, is also included as a part of the report.

This estimate shows total demand for all oils in 1952 at 7,708,000 bbl. daily, including 421,000 bbl. daily exported and a domestic demand of 7,287,000 bbl. daily. Total demand represented a gain of 3.4 per cent over 1951.

Crude production for the year represented a gain of 1.8 per cent over 1951. Production of natural gasoline and cycle products increased 7 per cent, and imports were up a little more than 13 per cent.

The bureau stated that domestic demand in 1952 was materially less than expected due, in part, to the effects of the long refinery and steel strikes.

Product Exports Drop

WASHINGTON.—Exports of major oil products dropped to an average of 187,200 bbl. daily during the week ended December 12 from 227,900 bbl. daily in the preceding week, according to figures compiled by the Petroleum Administration for Defense.

Substantially lower shipments were reported in all products except aviation gasoline and residual fuel.

Details of the week's movement, compared with the preceding week, and averages for the 4 weeks ended December 12 are shown in the accompanying table, in thousands of barrels daily.

	Week ended Dec. 12	Week ended Dec. 5	Average 4 weeks
Aviation gasoline	31.9	28.2	40.3
Motor gasoline	41.7	62.2	49.2
Kerosine		11.9	7.1
Distillate	74.2	99.1	77.7
Residual	39.4	26.5	41.0
Total	187.2	227.9	215.3

WEST COAST

Monterey Loses Court Round

SANTA ANA.—The city of Seal Beach has police power within a 3-mile limit seaward and may seek to prevent Monterey Oil Co. from completing its drilling platform off the city's coast.

This was the ruling of Orange County Superior Judge Kenneth E. Morrison as he denied Monterey a writ of prohibition which would have prevented the city from interfering with the company's island-construction program.

The suit and ruling grew out of misdemeanor charges brought by the city of Seal Beach alleging violation of two city ordinances, one prohibiting drilling within the city limits and the other requiring that a building permit be obtained for any structure.

Monterey, which is expected to appeal the decision, had maintained that Seal Beach did not control the offshore area.

Great Lakes Firm Moving

LOS ANGELES.—Great Lakes Oil & Chemical Co. has begun operations in California under its own name and will move its headquarters from Grand Rapids, Mich., to Los Angeles in the near future.

The company several months ago bought all the properties of Cleveland Oil Co., a producing company with headquarters in Los Angeles.

Great Lakes recently spudded in the first California well in its own name, its 2 Edison in West Edison field near Bakersfield.

Puget Sound Refinery Planned

SEATTLE.—Pacific Oil & Refining Co. is planning to begin construction early this year on a new 10,000-bbl. refinery on Puget Sound near here, Joseph E. Erickson, Pacific Oil vice president, announced last week.

Erickson said the refinery will include catalytic cracking facilities and will operate on Canadian crude delivered from Alberta fields by Trans Mountain Pipe Line Co.

Completion of the refinery is scheduled for early in 1954.

TACKLING THE PROBLEM are the reserves committees of the A.P.I. and C.P.A. (Members in photo identified in text of story.)

Uniform Reporting Sought

UNIFORM methods of estimating reserves and reporting petroleum statistics in the United States and Canada are being worked out through joint efforts of the American Petroleum Institute and the Canadian Petroleum Association.

The first move was a meeting of the reserves committees of the two associations in Banff, Alta., last fall. The C.P.A. already is using A.P.I. methods in general in estimating proven reserves of crude oil, and further joint meetings are planned to perfect the method and to coordinate other oil and gas statistics.

Rules adopted . . . The Canadian group has agreed to adopt these A.P.I. rules in estimating proven reserves:

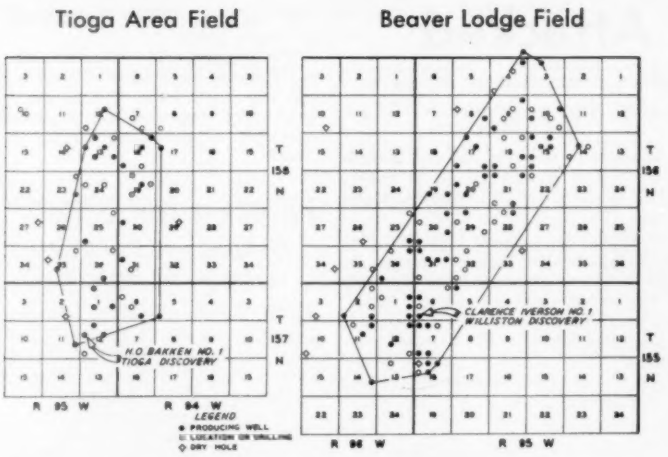
1. Proven reserves underlie drilled units (whether on 20, 40, or 80-acre spacings) and contiguous undrilled units where knowledge of geological and reservoir conditions makes reasonably certain that production will be obtained when these units are drilled.

2. In a field which is currently producing from a lower reservoir, oil in a higher cored and drill-stem-tested reservoir (cased off for future production) is not included in the figure for proven reserves in the field until at least one well has been put on production from this higher reservoir, and then only under those units which are believed to be proved by the coring, drill-stem testing, and performance of this well.

3. Not included are reserves of any oil which may be obtained through application of fluid-injection processes until such processes are put into actual operation.

Committee members . . . Members of A.P.I. and C.P.A. reserves committees present are: (Seated, left to right) D. V. Carter, Magnolia Petroleum Co., Dallas, vice chairman of the A.P.I. reserves committee; R. H. C. Harrison, president of the C.P.A., Calgary; F. H. Lahee, Sun Oil Co., Dallas, chairman of the A.P.I. reserves committee; J. D. Gustafson, Bailey-Selburn, Alberta, chairman of the C.P.A. reserves committee; Graham B. Moody, Standard Oil Co. of California, San Francisco.

(Standing, left to right) G. A. Van Wielingen, Canadian Gulf Oil Co., Calgary; B. I. Routh, Canadian Gulf, Calgary; D. R. Craig, Alberta Petroleum and Natural Gas Conservation Board; Morris Muskat, Gulf Refining Co., Pittsburgh; Gordon A. Connell, Royalite Oil Co., Ltd., Calgary; Paul R. Schultz, Standard Oil & Gas Co., Tulsa; Ralph Diamond, C.P.A. statistician, Calgary; Frank R. Clark, Ohio Oil Co., Tulsa; K. E. Beall, Phillips Petroleum Co., Bartlesville; A. D. Brown, Federated Petroleums, Ltd., Calgary; Morgan J. Davis, Humble Oil & Refining Co., Houston; Karl A. Mygdal, Pure Oil Co., Chicago; Fred Van Covern, A.P.I., New York City; and A. E. Kellar, Texas Exploration Co., Calgary.



North Dakota Outlook

State inspector predicts 305 wells will be drilled this year; 1952 saw 141 completions, with 38 rigs now running

WILLISTON, N. D.—North Dakota's oil industry, which was born late in 1951 and which blossomed in last year expects to double its 1952 drilling performance this year.

"It is believed conservative to forecast that 200 producers and 40 dry or marginal edge wells will be completed in 1953 and that 65 rank wildcats will be plugged and abandoned, making a total of 305 wells."

This is the opinion of Dois D. Dallas, a member of the staff of Dr. Wilson M. Laird, North Dakota state geologist. Dallas at present is North Dakota's only field inspector. Under state law the state geologist is charged with enforcement of regulations and orders of the State Industrial Commission, which controls North Dakota's oil activity.

At present, according to Dallas, 25 rigs are drilling development wells, 13 are drilling wildcat wells, and three rotaries and three cable-tool rigs are stored for the winter. As yet, no wells have been completed with cable-tool rigs.

Last year's record . . . During 1952 a total of 141 wells were drilled in North Dakota, involving a total footage of 1,150,174.

Of this total, 51 were dry, including 38 rank wildcats and 13 edge wells. The remaining 90 are producers in five separate fields.

Beaver Lodge field in Williams County, which contains the Williston basin's discovery well, Amerada Petroleum Corp.'s famed 1 Clarence Iverson, leads the other fields with a total of 61 producers and 8 dry holes.

The unnamed field in the Tioga area was second with 26 producers and 5 dry holes. The other three fields, still officially unnamed, each have one well. They are in the Hofflund, Charleson, and Croff areas.

The proven area of Beaver Lodge has been set by Dallas at 14,252 acres, and that of the Tioga area field at 8,155 acres.

"These figures are based on a planimeter measurement of the area enclosed by joining outer wells in the two fields on maps (See drawings). It is assumed that there will be at least as many productive acres outside these enclosures as there will be dry acres inside—a reasonable assumption since few dry-hole limitations have been established.

"On the basis of a 200-bbl. allowable for each 40-acre unit, the proven area represents a potential daily production of 112,000 bbl.," according to Dallas.

Amerada leading . . . Amerada Petroleum Corp. is credited with having opened all five fields. Of the 90 producing wells, Amerada drilled 78. H. L. Hunt Oil Co. drilled 10, and Concord et al drilled 2.

All 90 wells have been completed in the Madison limestone (Mission Canyon formation) of Mississippian age. However, five wells which penetrated deeper formations have indicated commercial production in the Devonian or Silurian or both. The basin discovery, in fact, produced from the Devonian and Silurian both before it was known that it also had the shallower Madison production.

Allowables . . . The Beaver Lodge Madison pool is the only one to date for which the state has set an allowable and spacing plan.

That allowable is 200 bbl. per day per well on a 40-acre spacing pattern. Of the 90 wells, all but 5 are capable of flowing the allowable of Madison crude (average of 43° A.P.I.) with a gas-oil ratio of about 1,100 cu. ft. per barrel. At present all the gas is being flared.

Although the state allowable of 200 bbl. per day per well applies only to the one pool, the operators are producing all wells on an equal basis. Due to transportation difficulties and a lack of market outlets, the wells have been restricted to about 140 bbl. per day, but this figure varies from month to month.

"This condition will be the prevailing one for the foreseeable future, and it is quite possible that pipe line, transportation, and market facilities will so lag production that most of the wells will never, in their lifetime, reach a 200-bbl. daily production, Dallas believes.

New prospect . . . Almost certain of becoming a pool opener in the shallower part of the basin in North Dakota, in Dallas' opinion, is the Crawford Smith-Zach Brooks-Berentson well in the Westhope area of Bottineau County.

This important wildcat is located about 5 miles south of the international boundary, and the operators are currently pumping from the Charles formation of Mississippian age at a depth of 3,353 ft. to 3,450 ft. No production history has been established for this well but it is known to be making considerable water.

The Charles formation lies at the top of the Madison group. The Madison pay is encountered between 8,100 and 8,700 ft. in the Tioga and Beaver Lodge fields.

Though the commercial possibilities of the Westhope well are yet to be established, the strike is nevertheless significant in that it has sparked an influx of new operators into a new area.

Imports Rate Attacked

Brown includes these with price controls and threat to depletion allowance as industry's big problems in 1953

HOUSTON.—Oil imports, price controls, and tax legislation were cited as major problems facing the petroleum industry by Russell B. Brown, general counsel of the Independent Petroleum Association of America here January 6.

Addressing a meeting of independent operators, Brown said the policy of the I.P.A.A. is not against imports, but rather one which believes imports should supplement a vigorous domestic industry rather than discourage its development.

Asserting imports have made heavy inroads on the domestic market, Brown declared that the entire increased refining capacity along the East Coast since World War II has been supplied by imports. And, he continued, while cutbacks are being made in Texas production arrangements are being made for the importation of 40,000,000 bbl. of crude from Kuwait at the rate of 25,000 bbl. per day "by a company not presently engaged in imports." (See International.)

Excessive imports, he said, will stifle the development of needed reserves in this country by taking from the market money required for continued drilling.

Price controls . . . Another hindrance to increased drilling, Brown said, has been the arbitrary setting of price controls on oil, which not only resulted in less direct income to the producer but which invoked extra hardships in view of the higher prices on equipment and materials.

Brown told the independents that the sentiment in Washington is for removal of all controls, and the trend should be accelerated once things are better organized.

Prospects for lifting controls on steel are bright and steel-industry leaders have indicated they will meet steel requirements for the 1953 drilling program if it does not exceed 50,000 wells, Brown said.

Depletion . . . Brown told the independents the petroleum industry should prepare itself to once again justify the depletion allowance before congressional committees.

In talking with House members, he said, he gained the impression that the depletion provisions of the tax bill would not encounter any significant opposition. However, the trip through the Senate is expected to be rough, due to a few, but vociferous, opponents, he said.

The entire industry also should be concerned with a future conference on national resources called by the Ford Foundation. Policies may be formed by the conference, he said, which could be divergent to sound industry practices if the petroleum industry should fail to take an active interest and part in the proceedings.

Tanker Orders Dominant

The dominant position of tankers in current ship-construction activity in the United States is made clear in the year-end statement of L. R. Sanford, president of the Shipbuilders Council of America.

During 1952, construction contracts were placed for 27 vessels, aggregating 486,060 gross tons and 742,500 deadweight tons. All these new construction contracts are for tankers with the exception of one 16,000-dwt. bulk dry-cargo carrier, Sanford said.

Particularly noteworthy among the 1952 contracts is one for two 45,400-dwt. tankers. These are 736 ft., 6 in. in over-all length and with a beam of 102 ft., and are the largest on order in the United States. Another contract covers four tankers of 38,000 dwt. each.

At the end of the year, there were 92 merchant vessels of 1,000 gross tons or over, under construction in the United States, aggregating 1,317,380 gross tons and 1,959,750 deadweight tons. They consisted of 29 cargo vessels, 55 tankers, 7 bulk dry-cargo carriers and one ferry boat.

Sanford commented that the outlook for the ship-repair yards in 1953 is not too bright. Shipbuilding yards have a backlog of work through 1953 and possibly early 1954. There are some prospects for new construction but it appears that deliveries will far exceed new contracts.

Appleman Properties Sold

TULSA.—Kansas and Oklahoma oil properties of Nathan and Janet Appleman have been purchased by Oil & Gas Property Management, Inc., of New York and Dallas, and Raymond F. Kravis, Tulsa.

The properties, 34 in Kansas and 1 in Oklahoma, include 258 oil wells and 146 water-input wells. Current net interest daily production is estimated at 1,600 bbl. Consideration was not disclosed.

Forecast for '53

Rodgers sees lower prices, increased offshore activity

NEW YORK.—There will be both good and bad in the year ahead for the petroleum industry, in the opinion of W. S. S. Rodgers, chairman of the board of The Texas Co.

On the good side, settlement of the tidelands question "will result in renewed exploration and development" along the Gulf and California coasts, he said. Offsetting this, however, is the prospect of lower product prices as a result of the government program of increasing the nation's ability to produce crude oil and increasing refining capacity.

In a year-end statement the Texaco executive said:

"Business generally can be encouraged by the sound policies of the new administration. Possible reductions in the federal budget will permit tax relief for our overburdened industry. Defense spending may decline during the year, but business as a whole should still be on a sound basis by the end of 1953."

As to the supply-demand picture, Rodgers pointed out that during the last few years "demand for petroleum products has more than kept pace with the expansion of our industry. There is now some evidence that the government program of increasing our potential crude producing capacity and refining capacity has not only caught up with but exceeded the demand; this will probably mean lower prices for products."

The Iranian situation, Rodgers said, "continues to be a cause of concern to the industry. The arbitrary attitude of the Iranian Government preventing a reasonable settlement has disturbed the international relations of other companies, American as well as foreign.

"An equitable solution of the Iranian problem would help restore confidence in international agreements. The United States Government should strive to negotiate treaties with foreign governments to guarantee fair treatment of American private investments abroad."

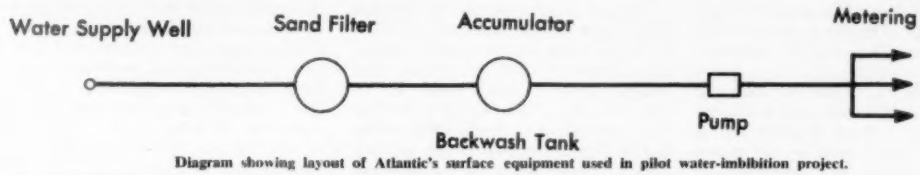
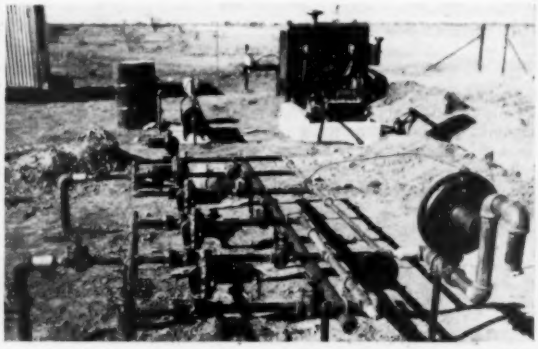


Diagram showing layout of Atlantic's surface equipment used in pilot water-imbibition project.

WATER for the imbibition wells is furnished by one well 170 ft. deep in which a vertical turbine-type pump is set at about 140 ft. Pump is driven by a gas engine through a right-angle drive.



FUEL GAS for engines and gas for blanketing water in the accumulator tank is furnished through this manifold. Engine drives a reciprocating pump to be used if necessary to deliver water to the injection wells.

New Process Under Test

Water being injected at rate of 400 bbl. daily in Driver field pilot project as Atlantic begins "imbibition" flood

Roy F. Carlson

MIDLAND. — There's been no increase in production yet, but Atlantic Refining Co.'s water-imbibition project in the Spraberry trend is well under way.

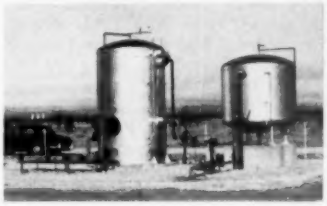
Water is now being injected through two wells, and a third injection well is scheduled to be in use soon. On January 4 a total of 17,547 bbl. had been injected, with water entering into the oil reservoir at a rate of about 200 bbl. per well per day. Injection was started November 20.

Atlantic is using the new secondary-recovery process in the upper Spraberry formation under its W. M. Schrock lease in Driver field of Glasscock County. The pilot project is expected to answer the question of whether field application of the new water-imbibition technique will provide results as satisfactory as those obtained in the laboratory.

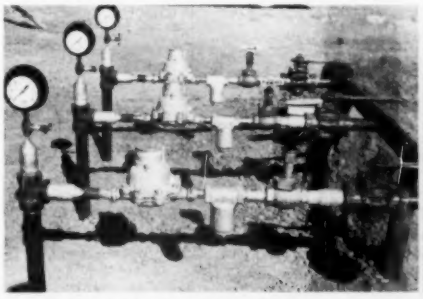
In lab experiments, Atlantic technologists were able to obtain an average recovery from Spraberry cores of 31 per cent of the oil in place. If the imbibition process should work in the Spraberry, it would mean an ultimate recovery of about three times that expected by natural-displacement recovery. *(The Oil and Gas Journal, November 17, page 230).*

Imbibition is the name given Atlantic's process which is based on the idea that the tight Spraberry formation will absorb water through natural capillary attraction, and the absorption of the water would free the oil.

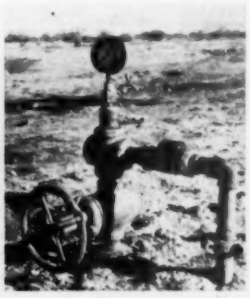
The process was developed in an at-



INJECTION WATER is filtered in a sand filter tank shown at right, from which it passes into an accumulator tank shown in the center. This accumulator tank provides a storage vessel for steady flow of water to the injection well manifold and, used with the gas blanket, furnishes a means for backwashing the filter tank. Injection well manifold is at left.



FLOW OF WATER is regulated by the manually operated needle valves downstream from the plug valves, and is measured by the meters shown. Line pressures are indicated by the gages to be near 0 psig.



Surface equipment of the injection well is simple, including a check valve, a gage, and other valving.

tempt to increase recovery from the tight Spraberry matrix, which, because of its fractures does not lend itself to conventional water flooding or to gas injection. *(See The Oil and Gas Journal, November 17, pages 230 and 260).*

Water supply . . . Water for the input wells is obtained from a well in a fresh-water sand at a depth of about 170 ft. Tests of this well indicate that it can produce at a rate of 2,400 bbl. per day, sufficient to meet the needs of the current injection wells and a planned third one to be put in service early this year.

Water from the well is not treated chemically before injection, but is run through a sand filter to remove entrained solids. From the filter, water goes to an accumulator tank and from the accumulator it goes to the injection well manifold.

A pump is installed in the line ahead of the manifold in the event larger volumes of water are to be injected, but at present water flows to the injection wells under its own head.

A gas blanket is maintained in the accumulator to exclude air from the system and to furnish a means for reversing flow of water in the event that the filter requires backwashing. The gas blanket is supplied to the accumulator tank through a system that also furnishes gas to the engines on the pumps and provides the means for backwashing the filter. Pressure in the accumulator is maintained at about 10 psi.

Metering of the water is provided for each injection well at the manifold. Regulation of flow is accomplished manually by adjustment of needle-type valves in the individual injection-well lines.

Pipe Line Supported

Texas groups critical of California refiners for failing to encourage construction of crude-oil line to California

AUSTIN.—Failure of California refiners to commit themselves to buy oil shipped from West Texas through the proposed West Coast Pipe Line Co. line has resulted in strong protests among Texas groups.

The executive committee of the Texas Independent Producers and Royalty Owners Association, meeting here last week, adopted a report blaming the situation on the large importing companies.

The report accused the major companies of "manipulations to create shortages of oil" as an excuse for increasing imports.

"The best illustration at hand of their resisting domestic oil in favor of foreign imports may be seen in the obstacles being erected to the building of an oil pipe line from West Texas to oil-short California," the report said. West Texas production, it continued, "has been too great for demand for several years, and the need for an additional outlet is serious. Moreover, California is no longer self-sufficient as to oil, and importers are making much of this as an excuse to import more oil from abroad."

Culberson objects . . . Olin Culberson member of the Texas Railroad Commission, was quoted as saying that failure of the West Coast refiners to sign commitments for crude through the West Coast line "looks to me like a repression or a restraint on the West Texas crude-oil market."

"With California so short in crude and with the pipe-line authorized by the Government to be laid, they are denying a much-needed market for West Texas oil by reason of their failure to encourage the line by refusing to enter into an agreement to purchase crude when they need it."

Midland meeting called . . . In Midland, business and civic leaders called a meeting to discuss ways to further plans for the West Texas-to-California crude-oil carrier. Principal speaker was to be Alvin Lane, state chairman of the Republican party. Lane's law firm is special counsel for West Coast Pipe Line Co., which has planned to build the line.

Lane called attention to the fact that the Railroad Commission cut the state's allowable in December and again in January and said: "Now that Texas has assurance that it will get its tidelands back, we are confronted by a 'Tied Lands' battle."

The Texas reaction followed publication of a letter from Reese Taylor, president of Union Oil Co. of California to West Coast Pipe Line Co. saying that Union was interested in but had not committed itself to shipments of crude through the proposed line.

Union's letter . . . In the letter, released to the press, Taylor said:

"While Union at this time cannot make any commitment in this regard, we have given considerable study to this matter and, assuming the line would be ready for operation in 12 to 18 months hence then, upon the basis of your proposed pipe-line tariffs, our present estimates of our future crude-oil requirements, and depending upon crude-oil prices then prevailing in West Texas and California, we may be in a position to utilize from 20,000 to 30,000 bbl. per day of your pipe-line capacity."

Many industry observers had been looking to Union as a tipoff on whether the pipe-line company would be able to obtain commitments for sufficient crude oil to guarantee financing and building of the line in the near future.

The proposed line would be a major crude-oil carrier running from Midland to the Los Angeles Harbor area, linking the West Texas producing fields to the California refining centers.

Taxes on Gas Raise Fears

AUSTIN. — Heavy state taxes on natural gas could mean a curtailment of petrochemical-industry expansion in Texas.

This possibility is suggested in a study of gas economics published by the University of Texas Bureau of Business Research.

Gas taxes accounted for only 3.44 per cent of Texas' gross revenue in 1951, the report said, but taxes on this industry have been increasing continually since 1931, when they accounted for only .02 per cent of the state's income. Also, the report pointed out, the gas-gathering tax now under attack in the courts, would double the $14,246,000 collected in the fiscal year ending August 31, 1951.

Fuel costs are not necessarily a predominant factor in plant locations, the report said, but industries using natural gas as a raw material would be hit at the basic economic level.

The application of a tax on raw materials in a restricted area such as a state may decrease the number of firms operating there or cause prospective new plants to locate elsewhere, the report concluded.

Spraberry Fields Combined

AUSTIN.—Spraberry trend fields in five West Texas counties have been combined into a one-pool designation by the Texas Railroad Commission. The commission assigned this name to the 415,000-acre area: "Spraberry Trend Area Field, Midland, Glasscock, Reagan, Upton, and Martin Counties."

Fields involved are Germania, Tex-Harvey, Driver, Weddell, Aldwell, Benedum, Midkiff, North Pembrook, and Pembrook pools. The commission

ruled that development to date and extension projects have proven the fields to be producing from a common reservoir.

Fields not covered by the order are Flat Rock and Pegasus (Spraberry), in Upton County; Clarence Scharbauer (Spraberry), Midland County; and Glass (Spraberry), in Martin County.

Rowan Buys Seven Rigs

FORT WORTH. — Rowan Drilling Co. has purchased all of the rotary drilling equipment of McQueen & Clevenger, Fort Worth. Included were six power and one steam rig, plus other equipment.

Consideration involved was not disclosed. The purchase gives Rowan a total of 32 rigs now operating. All of the seven rigs involved are in West Texas and New Mexico. An announcement said George McQueen, Fort Worth, and Arch Clevenger, Midland, partners in the drilling firm, will continue in the oil business. The firm of McQueen & Stout, Fort Worth, was not involved.

Carbon-Black Forecast

Black producers turning to liquids for feed as gas costs climb; production will double by 1975, A. G. Dale predicts

AUSTIN. — Carbon-black production in Texas may double within the next 20 years, and indications are that a much greater share of it will be manufactured from liquid hydrocarbons.

This, according to Alfred G. Dale, research assistant for the Bureau of Business Research of the University of Texas, will be due largely to two things—the increasing cost of natural gas and the high yield of black from the furnace process using liquid hydrocarbons as feed.

Dale said that the high cost of gas was the factor which motivated the shifting of the center of the carbon-black industry from Pennsylvania to West Virginia and then to Texas. The same reason currently is resulting in the migration of black industry from the Texas Panhandle to other parts of the state. In 1960, Dale said, the Panhandle produced more than 90 per cent of the state's output. By 1950 this percentage had dropped off to 67.3.

Costs climbing . . . From an average of 1 cent per M.c.f. in 1940, he said, the price of natural gas climbed to 4.5 cents in 1950, with further increases the past 2 years. Part of this increase has been offset due to the improved furnace method of extracting black from gas which has improved average yields of furnace, channel, and other blacks from 1.94 lb. per M.c.f. in 1940 to 2.57 lb. in 1950. In 1940, channel black accounted for 492,000,000 tons, or 86 per cent, of the nation-wide total of 569,000,000 tons. By 1950 channel-black production was 617,000,000 tons—less than half of the total of 1,382,000,000 tons of black produced.

Use of natural gas for black manufacture fell off from 393 billion cubic feet in 1946 to 308 billion cubic feet in 1951. Texas Railroad Commission figures show that gas used for black during the first 8 months of 1952 totaled 208 billion cubic feet.

Dale said the increasing use of liquids as raw material makes it reasonable to assume that the carbon-black industry may be divorced from the gas fields. In particular, he said, it is bound to accelerate the industry's exodus from the Panhandle.

Expansion . . . During the first 7 months of 1952, the carbon-black industry in Texas earmarked $5,000,000 for expansion and new plants. Dale said this spending trend together with the big and growing demand for black from nearby major synthetic-rubber plants tend to back up the forecast of the President's Materials Policy Commission that black production will double by 1975.

Texas Sets Record

Production erases marks, but drilling disappoints

HOUSTON.—More than 1,168,000,000 bbl. of crude oil was produced in Texas last year to set a new all-time record and pass the billion-barrel mark for the second time in history.

An estimate by the Texas Mid-Continent Oil and Gas Association, based on U. S. Bureau of Mines figures, showed a flow of about 1,028,000,000 bbl. of crude oil and 140,000,000 bbl. of distillate.

Texas fields flowed at the average rate of some 2,815,900 bbl. per day during the year. This was about 700,000 bbl. a day more than the rate for the whole Middle East, about 300,000 bbl. per day higher than total output of all Western Hemisphere countries outside the United States, and more than twice the estimated output of Russia and her satellites, the association pointed out.

Texas now has 139,629 producing oil wells, an increase of 7,162 over 1951, and 3,241 separate fields, a gain for the year of 570.

About 36.8 per cent of all wells drilled last year in the state were dry, compared to 33.6 per cent in 1951.

Drilling slowdown . . . Though 88 more wells were drilled last year, 17,099, than in 1951, to set another record, the total was off nearly 1,000 wells from the number generally forecast a year ago.

The association said apparently one of the principal factors was a curtailment of operations in the Spraberry trend area due to high well costs and low recovery rates.

While more wells were drilled, 487 fewer were completed as oil or gas producers in 1952.

Expansion . . . The association said its tabulation of construction projects by all segments of the industry in Texas showed nearly a billion dollars earmarked for expansion last year.

Basing its figures on certificates of necessity granted by the Defense Production Administration, the association said about $900,000,000 in facilities was approved during the first 11 months of 1952. This, it pointed out, does not include outlay for expansion projects for which certificates were not solicited.

Leading the various industry divisions at the end of the year was Texas' giant petrochemical industry which earmarked $320,000,000 for 82 projects.

Chadbourne Reopening Asked

AUSTIN.—West Texas' Fort Chadbourne field, closed for nearly a year, will be reopened soon if the Texas Railroad Commission approves a request of operators in the field.

The commission has scheduled a hearing on the proposal for January 20. In their request for reopening, the operators said Lone Star Gas Co. is scheduled this month to complete a gasoline plant which will handle gas from the field.

The field was shut in by the commission February 1 last year because of gas wastage. One well was permitted to continue production in order to provide gas for homes in the area. The field, located in Runnels and Coke counties, has 229 producing wells and at the time it was shut in had an allowable of 16,250 bbl. daily. The commission said 11,000,000 cu. ft. of wet gas was being flared daily.

MIDDLE EAST

Hope for Settlement

British and American officials show guarded optimism over Iranian reaction to latest offer in deadlocked oil dispute

Dahl M. Duff

THE latest United States Government attempt to settle the Iranian oil dispute was reported to be making headway last week.

Secret discussions were in progress in Teheran and London. State Department and British foreign office officials were optimistic, though this attitude was tempered by the realization that other hopeful efforts over the last year failed against the uncompromising position of Prime Minister Mossadegh.

No specific details were disclosed on the proposals being made. The fact that the Iranian Government itself apparently is going along with the confidential nature of the negotiations was in itself a hopeful sign. In the past the first indication of trouble has often come in unofficial Iranian statements.

The new approach to the Iranian prime minister was first made about 2 weeks ago by U. S. Ambassador Loy Henderson following his return to the Iranian capital. It is understood that Henderson felt Mossadegh out on several aspects of the dispute without making specific offers. Mossadegh is said to have reacted favorably and indicated his cooperation.

Last week, high-level government officials were reviewing Henderson's reports in London and in Washington in what apparently was an attempt to determine what the next move will be. In London the British cabinet held a meeting at which ministers concerned with the Iranian situation were present. This was followed by a foreign office conference attended by the three ranking United States diplomats in London —Walter S. Gifford, U. S. Ambassador; Henry A. Byroade, Assistant Secretary of State for Near - Eastern affairs, and Julius Holmes, U. S. minister.

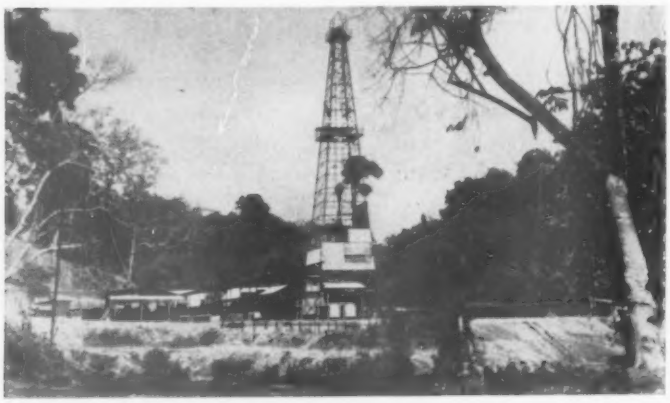
Standing pat . . . The British apparently are standing fast on their demand for neutral arbitration of their claims that Anglo-Iranian Oil Co., Ltd., be compensated for the loss of its properties. Reports from London indicated that this demand includes payment for the loss of profit arising out of abrogation of the concession before its normal 1992 expiration date.

The United States is understood to be ready to advance Iran a substantial sum if it agrees to a workable settlement. The amount presumably would be much larger than the $10,000,000 which was mentioned in the offer of last August when President Truman and Prime Minister Churchill sent a joint note to Mossadegh.

Situation precarious . . . Recent internal developments in Iran appear to support the U. S. Government's view that some kind of settlement bolstering Mossadegh's government is imperative in view of the danger that the Communists will take over the country. Four persons were killed and hundreds injured in a new outbreak of rioting and disturbances which lasted 3 days. In the holy city of Qum, religious groups battled members of the Communist Tudeh party.

Dr. Mossadegh won a 64-0 vote of confidence in the Iranian parliament on the issue of a new election law, but it was reported that differences had arisen between the prime minister and the powerful Iranian religious leader, Ayatollah Kashani. During debate, Dr. Mossadegh denounced opposition to his proposed election law and declared that the present time was a critical juncture in the nation's history, with Prime Minister Churchill in the United States for "all important oil talks" with the U. S. Government.

What part the large United States oil companies would play under any new settlement was not clear. Reports were that a plan being considered called for setting up a new international company to operate the Iranian industry. It is generally realized in the industry that Iranian crude is not now needed in world markets. Anglo-Iranian is said to be prepared to take up to about 200,000 bbl. daily of products if operations at Abadan are resumed, but this leaves unanswered the question of crude exports. Any wholesale attempt to import Iranian crude or products into the United States would undoubtedly meet determined opposition from many domestic producers.



Looking for Oil in Eastern Pakistan

This is the Patiya wildcat in the Chittagong Hill Tracts of East Pakistan. It is a part of the continuing effort of Pakistan Petroleum, Ltd., to find new and more important sources of oil production in the country. At last reports, the Patiya well was drilling below 7,000 ft. Pakistan Petroleum's second test in East Pakistan is in the Patharia Forest Reserve. The first well in this area recently went to 5,000 ft. without success. In West Pakistan, the company, an affiliate of Burmah Oil Co., Ltd., is drilling a second well near the Sui gas discovery and exploring a new structure at Chak Naurang in the Punjab.

Sinclair - Gulf Deal Rumored

NEW YORK.—Sinclair Oil Corp. is negotiating for the purchase of a substantial quantity of Kuwait crude for import into the United States.

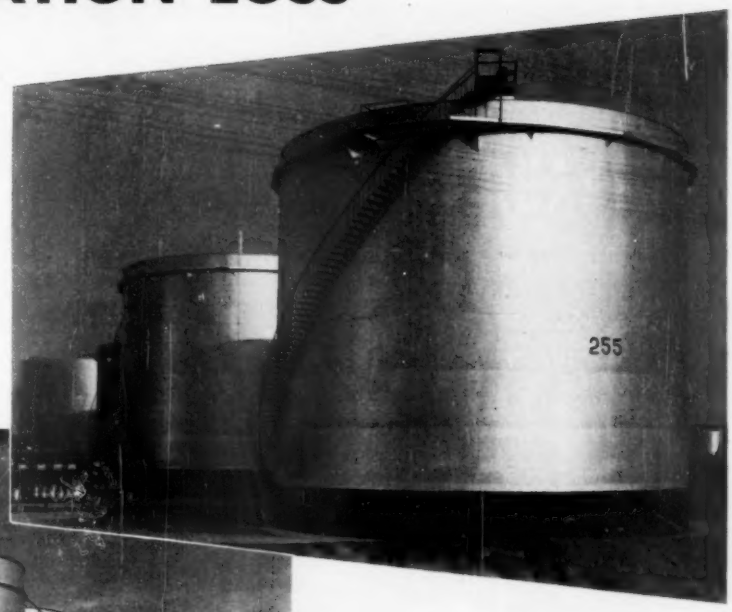
The quantity involved was said to call for shipments at a rate of about 25,000 bbl. daily over a period of 5

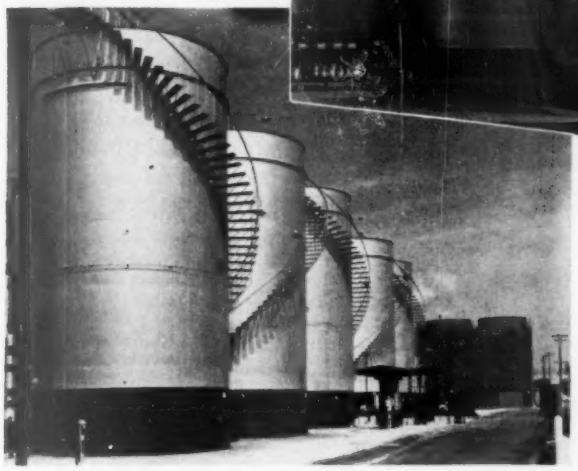
EVAPORATION LOSS

is *not* a necessary evil . . .

Right: A group of 25,000-bbl. tanks with Horton Floating Roofs installed for gasoline storage at the Standard Oil Company of California's Bakersfield Refinery.

Below: Row of 2,000-bbl. tanks with Horton Floating Roofs at this same refinery.





. . . if you use HORTON* FLOATING ROOFS

Horton Floating Roofs have, for years, provided an effective means of preventing costly evaporation losses during the storage of volatile liquids.

How? A Horton Floating Roof rides directly on the surface of the liquid in the tank. The entire bottom side of the Horton Floating Roof is normally in contact with the liquid. Space where air-vapor mixtures might form is eliminated. There is no air-vapor mixture above the liquid to be vented and lost. Fire hazard and corrosion are also reduced as a result of the elimination of the vapor space.

The Horton Seal, standard equipment on all Horton Floating Roofs closes the space between the deck of the roof and the shell of the tank. Vertical flexures every 22 inches enable the sealing ring to form a close contact to the inside of the tank shell. A gas-tight, weatherproof flexible fabric closes the space between the top of the sealing ring and the deck of the roof. In addition to the other functions of the Horton Seal, its gentle, even pressure keeps the floating roof centered at all times.

Sturdy, stable Horton Floating Roofs are built in three types—Pan, Pontoon and Double-Deck. For further information on Horton Floating Roofs or any other Horton structures, write our nearest office. There is no obligation on your part.

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Birmingham, 1.....1536 North 50th St.
Boston, 10.....1025-201 Devonshire St.
Chicago, 4.....2128 McCormick Bldg.
Cleveland, 15.....2204 Midland Bldg.
Detroit, 26.....1514 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston, 2.....2119 C & I Life Bldg.
Los Angeles, 17....1523 General Petroleum Bldg.
New York, 6.....3347—165 Broadway Bldg.
Philadelphia, 3...1615—1700 Walnut Street Bldg.
San Francisco, 4.....1554—200 Bush St.
Seattle, 1.....1325 Henry Bldg.
Tulsa, 3.....1606 Hunt Bldg.
Washington 6, D. C.....1139 Cafritz Bldg.

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Horton Steel Works, Limited, Fort Erie, Ontario, Canada
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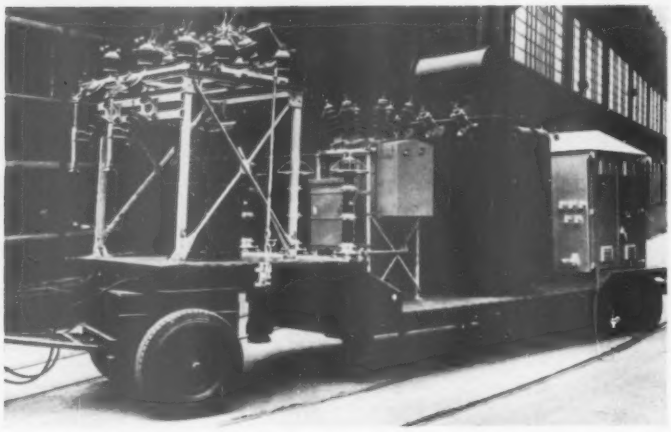
Constructions Metalliques de Provence, Arles-sur-Rhone, France
Chicago Bridge & Iron Company, Ltd., Apartado 1348, Caracas, Venezuela
Compremo, N.V., 21, Amstel, Amsterdam (C) Netherlands
Compagnia Tecnica Industria Petroli, Rome, Italy
Whessoe, Limited, Darlington, England
Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland
Sociedade Chibridge de Construcoes Ltda., Av. Franklin Roosevelt, 194-S/704-C, Rio de Janeiro, Brazil

years. The crude would come from the half share in the Kuwait operations owned by Gulf Oil Corp. The other half interest in Kuwait, now producing about 800,000 bbl. daily, is held by Anglo-Iranian Oil Co., Ltd., which has drawn heavily on this source for replacement of its Iranian loss.

The only company understood to be importing Middle East crude currently —aside from the major international groups which operate in the Middle East—is Atlantic Refining Co., which signed a long-term contract with Gulf for Kuwait oil about 2 years ago.

A Greek tanker which recently loaded crude at Kuwait was identified as Sinclair's. However, it was later reported that this vessel had been subchartered to Gulf and that no definite purchase deal had been made by Sinclair as yet.

LATIN AMERICA



TRAILER-MOUNTED UNIT will augment conventional stations. (Shell photo.)

Mobile Substation

Shell to use British-built unit in Western Venezuela

AN unusual mobile electrical substation has been built in Britain for Shell's operations in the Lake Maracaibo area of Western Venezuela.

The substation is mounted on a 40-ton trailer and is designed to augment or partially replace temporarily the existing stationary units in the transmission system serving the lake fields. It also can be used to provide a temporary supply in undeveloped parts of the fields not supplied from permanent stations.

The transmission system in use consists of double primary lines at 33 kv., 3-phase, 60-cycles, some 60 miles long, with a large number of secondary feeders operating at 6.9 kv. At intervals are 14 substations to step down power from 33 kv. to 6.9 kv., some of which are now approaching their full loading capacity.

Equipment . . . The mobile unit, the first of its kind built in Britain, cost about £17,500 or nearly $50,000. All the main items, including a 4,500-kva., 3-phase unit, an auxiliary 15 kva., single-phase transformer, 33-kv. switch gear, and all necessary control gear, are firmly fixed and cabled on the trailer. Accessories are carried in an accompanying truck. The unit is 38 ft. long, 10 ft. wide, and 16 ft. high. It was built by Parolle Electrical Plant Co., Ltd.

Accessory equipment provided to accompany the trailer includes a portable steel fence to be erected around the unit when operating, ground rods and connections, six cable drums each completed with a length of 6.9 kv. trailing cable with terminal clamps at each end, and four portable lighting standards each with a 500-watt fixture.

British to Supply Argentina

British sources will supply Argentina with around 80,000 bbl. daily of crude and fuel oil under the new reciprocal-trade agreement signed by the two countries.

During the 12-month period, Britain will supply Argentina with 2,060,000 tons of crude oil and 2,000,000 tons of fuel oil. These shipments will meet most of the Argentine import requirements. Principal British oil suppliers are Royal Dutch-Shell and Anglo-Iranian Oil Co., Ltd.

In return Britain will receive 1,800,000 tons of meat compared with the best postwar total of Argentine meat shipments to Britain of 1,783,000 tons in 1946. Besides the oil, Britain is to ship Argentina 800,000 tons of coal and 27,000 tons of tin plate. There also is provision in the agreement for the sale of British manufactured articles valued at £3,000,000 ($8,400,000).

Estimates in London were that the total value of the trade between the two countries during the year would be £167,000,000 ($467,000,000).

Creole Production Slips

Production of Creole Petroleum Corp. in Venezuela during November showed a relatively small decline of 5,139 bbl. daily from the previous month.

Operated output during November averaged 766,349 bbl. daily, consisting of 630,374 bbl. daily from Lake Maracaibo, 5,067 bbl. daily from Cumarebo and Mara, and 130,908 bbl. daily from Eastern Venezuela. Net production plus purchased royalty averaged 820,358 bbl. daily.

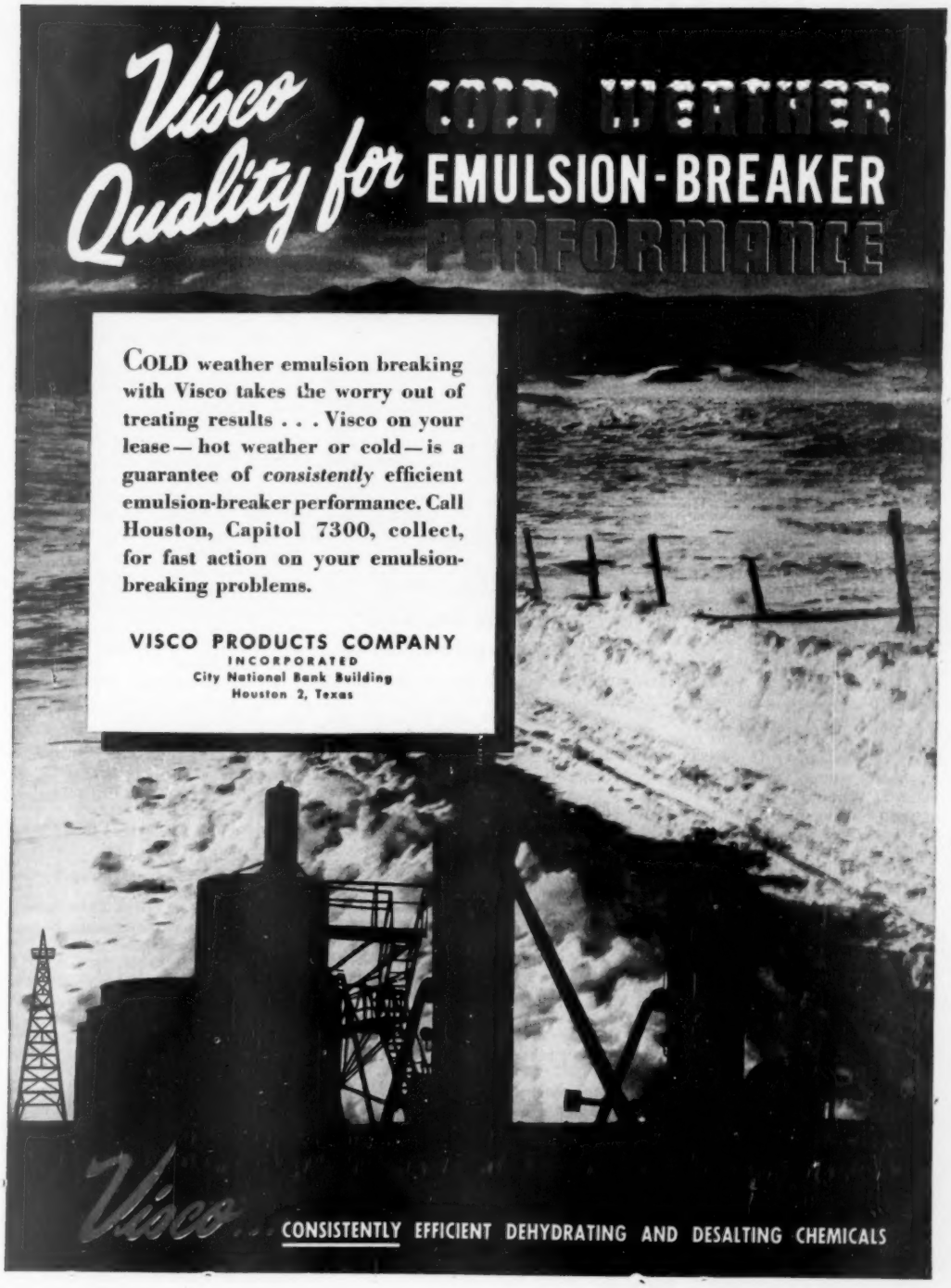
During November, Creole refined 67,242 bbl. daily at Caripito and 63,074 bbl. daily at Amuay. The company operated an average of 19.2 rigs and completed 20 wells of which two were exploratory. One of the exploration wells was an oil producer in the Maracaibo area, with initial production of 1,350 bbl. daily and 7,959 ft., total depth. The other, in the Dabajuro area, was dry at 6,360 ft., total depth.

AFRICA

East Africa Search Planned

D'Arcy Exploration Co., Ltd. (Anglo-Iranian Oil Co., Ltd.) and the Royal Dutch-Shell organization are making plans to start a comprehensive geological and geophysical program in East Africa in the near future.

Preliminary to this work, an extensive aerial-photographic survey is being undertaken with three planes chartered from Hunting Aerosurveys, Ltd. Operations based initially on Dar-es-Salaam, Tanganyika, have started over the Tanganyika coastal plain. To be covered later are Zanzibar and Pemba islands and parts of Kenya. Geological and geophysical ground surveys of various islands off the East African coast will be carried out by parties using the British Tanker Co. survey vessel, Burgan.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Pressed for Capital

Anglo-Iranian turns to the public for needed expansion funds (about $56,000,000) for first time in 30 years

BECAUSE of the capital needs arising out of its extensive refinery expansion, tanker construction, exploratory work, Anglo-Iranian Oil Co., Ltd., is going to the public for money for the first time since 1923.

The company announced in London that it would raise £20,000,000 ($56,000,000) by a public issue of 5 per cent debenture stock to be secured by a first floating charge on the company's assets. Application lists were to open January 6, and London market sources doubted that the British Government, the present majority stockholder, would take any of the new issue.

The company's expenditures for 1953 were estimated at £75,000,000 ($210,000,000) to be financed by its present resources, proceeds of the new issue, and retained profits. The company's last balance sheet showed that it then had nearly £80,000,000 ($224,000,000) of ready-money assets.

Anglo-Iranian is now in the midst of a program designed to provide facilities to replace those lost in Iran. Production is being sought in a number of areas, and the tanker fleet is undergoing steady expansion. All this requires heavy capital outlay. The expenditure is greater than the dollar comparison indicates, because the purchasing power of the pound in England is somewhat higher than the official $2.80 exchange rate.

1952 construction . . . In London, it was said that earlier reports that Anglo-Iranian would use part of the money raised in the new issue for a major effort in the western Canadian oil development were incorrect.

Anglo-Iranian carried out several major expansion projects and continued others during 1952, which was the first full year in its history without the Iranian properties which formerly made up the basis of its widespread activities. The company now has 12 refineries in the Eastern Hemisphere, and most of its crude-oil needs are met from its other important interests in the Middle East, namely the half share in Kuwait and the 23.75 per cent interest in the Iraq Petroleum Co., Ltd., group.

The company's new 80,000-bbl. daily Kent refinery in England is expected to begin operating early in 1953. Work began last fall on a 60,000-bbl. daily refinery in western Australia, and material is being assembled for the 100,000-bbl. daily refinery to be built in Aden. During the past year, the company broadened the exploratory work which is now being carried out in Papua (New Guinea), Trinidad, Sicily, Switzerland, East and West Africa, and Great Britain.

Expansion and modernization has been done at Llandarcy, Wales, and the Grangemouth, Scotland, refineries, and Anglo-Iranian will shortly become the largest refiner in Great Britain with a total capacity of about 210,000 bbl. daily. Catalytic cracking units were completed during the year at Llandarcy and Grangemouth, and the Kent unit will follow in 1953. All these units are of 12,000-bbl. daily capacity.

Cost Emphasized

Shell official cites huge postwar expansion outlay

THE tremendous cost involved in the vast expansion of facilities of the petroleum industry since the end of the war was described recently by F. A. C. Guepin, a Shell managing director, in a talk in London.

From the end of the war to the end of 1952, the industry in the United States invested about 17 billion dollars, while investments outside the United States during the same period were well in excess of 2 billion pounds, or more than 5½ billion dollars.

By the end of 1953, refining capacity in Western Europe is expected to exceed 90,000,000 tons (about 1,800,000 bbl. daily)—a five-fold increase since prewar. Of this, about 600,000 bbl. daily will be in the United Kingdom, representing a 15-fold increase over prewar, he said.

Plant construction . . . The Shell official said that refinery construction now represents, in round figures, a capital investment of nearly £10,000,000 ($28,000,000) per million tons (about 20,000 bbl. daily) of throughput. He estimated £140,000,000 (equivalent to nearly $400,000,000) will be spent each year until 1956 to expand the present world tanker fleet of 30,000,000 tons by another 10,000,000 tons.

Oil-industry profits are low per gallon sold, Guepin said, and in Shell's case, more than four times its total net profits of 1951 were paid out in various taxes and levies. The Shell Group alone has invested more than £100,000,000 ($280,000,000) on capital projects every year since the war.

The ultimate of bigness is not state-owned enterprises, he said. The international teamwork of the oil industry can only prosper under free enterprise. Although free enterprise must conform to the discipline, general welfare, and moral code of the community, it is the economic expression of a social system that values, respects, and requires individual freedom.

U. S. to Lay Line in France

The United States Government is preparing to lay a 375-mile pipe line across northern France to supply fuel to United States airfields.

The project was disclosed recently in Paris by Maj. Gen. Samuel D. Sturgis, new chief of the U. S. Army Engineers. He told the Anglo-American Press Club that the 12-in. line would run from near St. Nazaire on the French coast through Melun to Metz. The way now seems clear to begin construction following about a year and a half of negotiations with French authorities, he said. The line is designed to supply jet fuel to European-based planes of the United States.

A system of product lines was built about a year ago by the Army Engineers in French Morocco. A 20-in. line was laid 25 miles from Casablanca to the Nouaceur airport, and smaller lines of about 8-in. to four other new U. S. air bases. The cost of this project to the United States Government was reported to be around $28,000,000.

Shale-Oil Output Hiked

Production of crude shale oil by the Swedish Shale Oil Co. in Sweden is expected to be increased to 100,000 tons, or about 2,000 bbl. daily, in 1953.

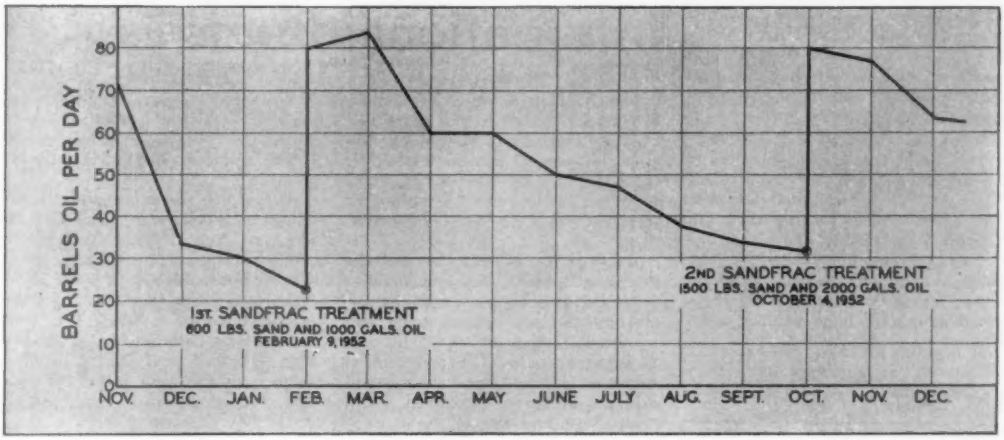
This expanded production, representing a gain of about 50 per cent over the present annual rate of about 65,000 tons, is due largely to reconstruction and enlargement work carried out at the Kvarntorp shale-oil plant.

The Swedish organization feels that it is close to economic operation of the shale-oil facilities. Efficiency of the retorting process has been improved, and byproducts are finding greater utilization. In addition to crude shale oil, the 1953 production is expected to include approximately 15,000 tons of liquid gas, 28,000 tons of refined sulfur, 45,000 tons of quicklime, and 100,000 tons of nitrogenous fertilizers.

If these operational targets are

PUT NEW LIFE IN OLD WELLS

Reconditioning by Dowell increased production 60 barrels of oil per day . . . boosted profits



No matter how you plan to work over that old well, it can be helpful to include a Dowell Service in the program. Good results have been obtained on thousands of wells that have been deepened, plugged back or reconditioned at the same depth. Dowell Services are applicable to nearly all types of formations under many different well conditions.

Here is a work-over case history:
This well was completed with an initial production of 72 barrels of oil per day natural. After three months, production had fallen to 23 barrels. A 1000-gallon Dowell Sandfrac treatment boosted production to 84 BOPD, flattening the decline curve as shown in the above graph. Payout time was less than five days.

During the next eight months production again declined, this time to 32 BOPD. A second Sandfrac treatment of 2000 gallons increased production to 80 barrels. Payout time was less than six days. Both treatments resulted in greater production than when the well was first completed.

Call Dowell today to discuss work-over problems on your old wells.

There are over 100 Dowell Offices, staffed with engineers trained in expert work-over methods.

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reached, the value of the byproducts will exceed appreciably that of the liquid fuels themselves. In the economics of the Swedish operation, the scale of byproduct recovery may become of greater importance than the technical improvements which have been made in the process.

Huge Tanker Launched

The largest tanker ever built for British owners was launched recently at the Clydeside yards of John Brown & Co., Ltd. It is the 32,000-ton "British Sailor" built for British Tanker Co., the shipbuilding subsidiary of Anglo-Iranian Oil Co., Ltd.

At the launching, Sir William Fraser, A.I.O.C. chairman, gave assurances to British shipbuilders that the demand for tankers of all sizes would continue for some time in the future. The "British Sailor" is the first of six 32,000-ton tankers ordered by the company. At present, A.I.O.C.'s wholly owned tanker fleet numbers 153 ships, in addition to a large number under charter.

FAR EAST

Drilling Begins Off Borneo

Drilling of the first major offshore test from a platform in the South China Sea along the coast of British Borneo was commenced recently.

The drilling is designed to determine the possibility of a seaward extension of Seria field which is operated by British Malayan Petroleum Co., Ltd. (Royal Dutch-Shell). The company expects to take the first well to between 7,000 and 8,000 ft., while three others may later be drilled at angles from the same platform. The platform, measuring 110 by 45 ft., is connected to the shore, about a mile distant, by an aerial ropeway *(The Oil and Gas Journal, November 10, page 86).*

New Guinea Search Shifted

Australasian Petroleum Co., Pty., Ltd., which has spent the equivalent of more than $21,000,000 in a thus-far unsuccessful exploratory program in New Guinea, is shifting the major part of its effort west to the area near the border of the Dutch-controlled part of the island.

Australasian Petroleum and the associated Island Exploration Co., Pty., Ltd., are owned by Standard-Vacuum Oil Co., Anglo-Iranian Oil Co., Ltd., and the Australian company, Oil Search, Ltd. Up to now, the program has been concentrated in southeastern New Guinea.

The recent annual report of Oil Search, Ltd., said the Papuan exploration so far has cost a total of A£9,500,000 ($21,400,000) and that a further A£1,200,000 ($2,700,000) has been budgeted for the work in 1953. The West Papuan basin in which much of the work will now be carried out offers attractive prospects, it said. A Canadian company was recently contracted to do an aerial magnetometer survey over about 35,000 sq. miles near the border of Dutch New Guinea.

The wells drilled in the Aure Trough area failed to show commercial production despite the abundance of surface indications. Last spring, Australasian Petroleum abandoned its Hohoro 2 well which cost about $1,500,000 to drill.

International Briefs

The Washington office of German Rovira S., United States representative of Yacimientos Petroliferos Fiscales Bolivianos, is now located at 1026 Seventeenth Street, N. W., Room 600, Washington. The former address was 707 Tower Building, Washington.

A new private company, Australasian Petroleum Refinery, Ltd., recently was organized in connection with the 60,000-bbl. Kwinana refinery being built by Anglo-Iranian Oil Co., Ltd., in Western Australia. Directors are all members of the Anglo-Iranian board. Purposes of the new company are to "erect, own, and operate" refineries of petroleum and its derivatives. Anglo-Iranian pointed out that Australasian Petroleum Refinery, Ltd., is not to be confused with Australasian Petroleum Co., Pty., Ltd., which is carrying on exploration in Papua.

Pakistan Petroleum, Ltd., recently commenced its second well at Sui (Dera Bugti), Baluchistan, in West Pakistan. The location is about 5 miles from the No. 1 well which discovered gas production *(The Oil and Gas Journal, November 24, page 88).* The spudding-in ceremony was performed by the acting governor of Sind, and M. J. Condon, in a talk on the occasion, pointed out that the company has not abandoned hope of finding oil in the Sui structure. The first well was taken to a depth of 10,049 ft.

A one-location stepout has been completed by Pantepec Oil Co., C. A., in the El Roble area in Eastern Venezuela, the company announced recently in Caracas. The well, on the northwest flank of the Guario dome, was a dual-zone producer which flowed initially at a rate of 517 bbl. daily of 44°-gravity crude through a 3/8-in. choke.

The 17,000-ton Caltex Bahrain, seventh ship to be built for Overseas Tankship (U. K.), Ltd., a Caltex affiliate, was launched recently by R. & W. Hawthorn Leslie & Co., Ltd., of Hebburn-on-Tyne, England. The vessel is a part of a Caltex program calling for the construction in the United Kingdom of 11 tankers in all.

A complete town of prefabricated structures is being transported to Aden to house about 2,000 of the men who will be engaged in construction of the new Anglo-Iranian Oil Co., Ltd., 100,000-bbl. refinery there. The prefabs, manufactured by a British firm from Scandinavian timber, include a hospital with operating and X-ray facilities, shops, canteens, and other buildings. The order amounted to approximately £250,000, or about $700,000.

Venezuelan Petroleum Co., a Sinclair affiliate, is stepping up its Venezuelan exploratory operations in an effort to increase production. E. L. Steiniger, president, said recently in Caracas that additional exploration work will be undertaken soon in Monagas and Anzoategui states and later in Barinas and Guarico states. He pointed out the company's Puerto La Cruz refinery is now running 18,900 bbl. daily of which the company's own production supplies only 13,500 bbl. daily.

A new combination atmospheric-vacuum crude-distillation unit with a capacity of 12,000 bbl. daily is scheduled to come into operation late this year at the Hamburg refinery of B. P. Benzin und Petroleum, G.m.b.H., in West Germany. The refinery now has a capacity with two units of 13,000 bbl. daily. Other improvements programed for the plant include a 4,000-bbl. Platformer and a 1,000-bbl. asphalt air-blowing plant—both to be in operation in 1954.

A 1,200-bbl. catalytic polymerization unit is scheduled to be inaugurated early next year at the 30,000-bbl. refinery of Industria Raffinazione Oli Minerali (IROM) at Venice, Italy. A lubricating-oil plant to produce 250 bbl. daily is to go in operation later this year.

CACTUS PLANT, Etter, Tex., where ammonia, nitric acid, and ammonium nitrate are manufactured.

make ammonium sulfate. Facilities have recently been added at Adams terminal to manufacture vinylpyridine. The first Phillips sulfur-recovery plant went into operation at Goldsmith, Tex., this year. Phillips Chemical Co., a wholly owned subsidiary, was organized in 1948.

The petrochemical process chain . . . The Phillips natural-gasoline department is responsible for the chain of operations by which raw hydrocarbon liquids are separated into petrochemical feed stocks. Raw natural-gasoline liquids extracted from casing-head and dry gas in Phillips gasoline plants are sent through an extensive high-pressure pipe-line system to central fractionating facilities. Here hydrocarbon streams in the light-ends and gasoline boiling ranges are taken out by superfractionation. Some of the hydrocarbon concentrate fractions so obtained are used as charge stock for Phillips petrochemicals operations.

Another example is the provision made by the refining department to furnish ingredients for the blend used as charge stock for Philblack manufacture. Part of this furnace-black charge stock is obtained from the 20,000-bbl. per day sulfur dioxide solvent-extraction unit at the Phillips, Tex., refinery which adjoins the superfractionator plant. The raffinate from this modified Edeleanu process goes back to cat cracker charge stock, while the aromatic extract fraction goes to the Philblack plant.

About 1,000 miles of pipe lines gather raw gasoline from natural-gasoline plants in Panhandle and Hugoton fields, from many fields in the Permian basin of Central West Texas, and from New Mexico, and converge at the Borger fractionator. The first step is the separation of ethane, a valuable chemical raw material useful for rubbers, plastics, and alcohols. Thereafter, by successive superfractionation, a considerable number of individual components, ranging from commercial grades to the very purest, are segregated. Among them are propane for liquefied petroleum gas and petrochemical uses; normal butane for synthetic rubber; isobutane for highest-grade aviation fuels; isooctane and normal heptane for antiknock reference testing; cyclohexane, a raw material for nylon manufacture; normal hexane for essential oil extraction, and many others.

Adjoining the Borger fractionator facilities are extensive treating facilities for production of specification of products free of sulfur and corrosive tendencies; cracking furnaces wherein paraffinic hydrocarbons are converted to olefinic; the only catalytic alkylation plant in existence for producing diisopropyl, which provides the highest quality blending stock for aviation gasoline, tetraethyl lead blending facilities and a vast storage and handling capacity for all the raw materials and products, including two underground caverns of about 60,000 bbl. each dissolved from salt 1,300 ft. below the surface.

PHILLIPS CHEMICAL CO. PLANTS AND FACILITIES

In operation and location:

- **Philblack plant, carbon black, Borger, Tex.**
- **Butadiene plant, rubber, Borger, Tex.**
- **Copolymer plant, rubber, Borger, Tex.**
- **Cactus plant, ammonia, nitric acid, ammonium nitrate, Etter, Tex.**
- **Adams terminal, ammonium sulfate, Houston Ship Channel.**
- **SAF Philblack plant, Borger, Tex.**
- **Goldsmith sulfur plant, Goldsmith, Tex.**
- **Crane sulfur plant, Crane, Tex.**
- **Phillips Terminal Co., Houston Ship Channel.**
- **Vinylpyridine plant, Houston Ship Channel.**

Under construction:

- **Ammonia plant, Houston Ship Channel.**

Operations . . .

Philblack Plant

The process for the manufacture of furnace black from special blends of oil is indicated in accompanying process flow diagram. Philblack "A," a medium-abrasion furnace black which is used primarily in inner tubes, tire sidewalls and carcasses, and mechanical goods; and Philblack "O" which imparts greatly improved wear-resistance

reached, the value of the byproducts will exceed appreciably that of the liquid fuels themselves. In the economics of the Swedish operation, the scale of byproduct recovery may become of greater importance than the technical improvements which have been made in the process.

Huge Tanker Launched

The largest tanker ever built for British owners was launched recently at the Clydeside yards of John Brown & Co., Ltd. It is the 32,000-ton "British Sailor" built for British Tanker Co., the shipbuilding subsidiary of Anglo-Iranian Oil Co., Ltd.

At the launching, Sir William Fraser, A.I.O.C. chairman, gave assurances to British shipbuilders that the demand for tankers of all sizes would continue for some time in the future. The "British Sailor" is the first of six 32,000-ton tankers ordered by the company. At present, A.I.O.C.'s wholly owned tanker fleet numbers 153 ships, in addition to a large number under charter.

FAR EAST

Drilling Begins Off Borneo

Drilling of the first major offshore test from a platform in the South China Sea along the coast of British Borneo was commenced recently.

The drilling is designed to determine the possibility of a seaward extension of Seria field which is operated by British Malayan Petroleum Co., Ltd. (Royal Dutch-Shell). The company expects to take the first well to between 7,000 and 8,000 ft., while three others may later be drilled at angles from the same platform. The platform, measuring 110 by 45 ft., is connected to the shore, about a mile distant, by an aerial ropeway *(The Oil and Gas Journal, November 10, page 86).*

New Guinea Search Shifted

Australasian Petroleum Co., Pty., Ltd., which has spent the equivalent of more than $21,000,000 in a thus-far unsuccessful exploratory program in New Guinea, is shifting the major part of its effort west to the area near the border of the Dutch-controlled part of the island.

Australasian Petroleum and the associated Island Exploration Co., Pty., Ltd., are owned by Standard-Vacuum Oil Co., Anglo-Iranian Oil Co., Ltd., and the Australian company, Oil Search, Ltd. Up to now, the program has been concentrated in southeastern New Guinea.

The recent annual report of Oil Search, Ltd., said the Papuan exploration so far has cost a total of A£9,500,000 ($21,400,000) and that a further A£1,200,000 ($2,700,000) has been budgeted for the work in 1953. The West Papuan basin in which much of the work will now be carried out offers attractive prospects, it said. A Canadian company was recently contracted to do an aerial magnetometer survey over about 35,000 sq. miles near the border of Dutch New Guinea.

The wells drilled in the Aure Trough area failed to show commercial production despite the abundance of surface indications. Last spring, Australasian Petroleum abandoned its Hohoro 2 well which cost about $1,500,000 to drill.

International Briefs

The Washington office of German Rovira S., United States representative of Yacimientos Petroliferos Fiscales Bolivianos, is now located at 1026 Seventeenth Street, N. W., Room 600, Washington. The former address was 707 Tower Building, Washington.

A new private company, Australasian Petroleum Refinery, Ltd., recently was organized in connection with the 60,000-bbl. Kwinana refinery being built by Anglo-Iranian Oil Co., Ltd., in Western Australia. Directors are all members of the Anglo-Iranian board. Purposes of the new company are to "erect, own, and operate" refineries of petroleum and its derivatives. Anglo-Iranian pointed out that Australasian Petroleum Refinery, Ltd., is not to be confused with Australasian Petroleum Co., Pty., Ltd., which is carrying on exploration in Papua.

Pakistan Petroleum, Ltd., recently commenced its second well at Sui (Dera Bugti), Baluchistan, in West Pakistan. The location is about 5 miles from the No. 1 well which discovered gas production *(The Oil and Gas Journal, November 24, page 88).* The spudding-in ceremony was performed by the acting governor of Sind, and M. J. Condon, in a talk on the occasion, pointed out that the company has not abandoned hope of finding oil in the Sui structure. The first well was taken to a depth of 10,049 ft.

A one-location stepout has been completed by Pantepec Oil Co., C. A., in the El Roble area in Eastern Venezuela, the company announced recently in Caracas. The well, on the northwest flank of the Guario dome, was a dual-zone producer which flowed initially at a rate of 517 bbl. daily of 44°-gravity crude through a 3/8-in. choke.

The 17,000-ton Caltex Bahrain, seventh ship to be built for Overseas Tankship (U. K.), Ltd., a Caltex affiliate, was launched recently by R. & W. Hawthorn Leslie & Co., Ltd., of Hebburn-on-Tyne, England. The vessel is a part of a Caltex program calling for the construction in the United Kingdom of 11 tankers in all.

A complete town of prefabricated structures is being transported to Aden to house about 2,000 of the men who will be engaged in construction of the new Anglo-Iranian Oil Co., Ltd., 100,000-bbl. refinery there. The prefabs, manufactured by a British firm from Scandinavian timber, include a hospital with operating and X-ray facilities, shops, canteens, and other buildings. The order amounted to approximately £250,000, or about $700,000.

Venezuelan Petroleum Co., a Sinclair affiliate, is stepping up its Venezuelan exploratory operations in an effort to increase production. E. L. Steiniger, president, said recently in Caracas that additional exploration work will be undertaken soon in Monagas and Anzoategui states and later in Barinas and Guarico states. He pointed out the company's Puerto La Cruz refinery is now running 18,900 bbl. daily of which the company's own production supplies only 13,500 bbl. daily.

A new combination atmospheric-vacuum crude-distillation unit with a capacity of 12,000 bbl. daily is scheduled to come into operation late this year at the Hamburg refinery of B. P. Benzin und Petroleum, G.m.b.H., in West Germany. The refinery now has a capacity with two units of 13,000 bbl. daily. Other improvements programed for the plant include a 4,000-bbl. Platformer and a 1,000-bbl. asphalt air-blowing plant—both to be in operation in 1954.

A 1,200-bbl. catalytic polymerization unit is scheduled to be inaugurated early next year at the 30,000-bbl. refinery of Industria Raffinazione Oli Minerali (IROM) at Venice, Italy. A lubricating-oil plant to produce 250 bbl. daily is to go in operation later this year.

CACTUS PLANT, Etter, Tex., where ammonia, nitric acid, and ammonium nitrate are manufactured.

make ammonium sulfate. Facilities have recently been added at Adams terminal to manufacture vinylpyridine. The first Phillips sulfur-recovery plant went into operation at Goldsmith, Tex., this year. Phillips Chemical Co., a wholly owned subsidiary, was organized in 1948.

The petrochemical process chain . . . The Phillips natural-gasoline department is responsible for the chain of operations by which raw hydrocarbon liquids are separated into petrochemical feed stocks. Raw natural-gasoline liquids extracted from casing-head and dry gas in Phillips gasoline plants are sent through an extensive high-pressure pipe-line system to central fractionating facilities. Here hydrocarbon streams in the light-ends and gasoline boiling ranges are taken out by superfractionation. Some of the hydrocarbon concentrate fractions so obtained are used as charge stock for Phillips petrochemicals operations.

Another example is the provision made by the refining department to furnish ingredients for the blend used as charge stock for Philblack manufacture. Part of this furnace-black charge stock is obtained from the 20,000-bbl. per day sulfur dioxide solvent-extraction unit at the Phillips, Tex., refinery which adjoins the superfractionator plant. The raffinate from this modified Edeleanu process goes back to cat cracker charge stock, while the aromatic extract fraction goes to the Philblack plant.

About 1,000 miles of pipe lines gather raw gasoline from natural-gasoline plants in Panhandle and Hugoton fields, from many fields in the Permian basin of Central West Texas, and from New Mexico, and converge at the Borger fractionator. The first step is the separation of ethane, a valuable chemical raw material useful for rubbers, plastics, and alcohols. Thereafter, by successive superfractionation, a considerable number of individual components, ranging from commercial grades to the very purest, are segregated. Among them are propane for liquefied petroleum gas and petrochemical uses; normal butane for synthetic rubber; isobutane for highest-grade aviation fuels; isooctane and normal heptane for antiknock reference testing; cyclohexane, a raw material for nylon manufacture; normal hexane for essential oil extraction, and many others.

PHILLIPS CHEMICAL CO. PLANTS AND FACILITIES

In operation and location:

- **Philblack plant, carbon black, Borger, Tex.**
- **Butadiene plant, rubber, Borger, Tex.**
- **Copolymer plant, rubber, Borger, Tex.**
- **Cactus plant, ammonia, nitric acid, ammonium nitrate, Etter, Tex.**
- **Adams terminal, ammonium sulfate, Houston Ship Channel.**
- **SAF Philblack plant, Borger, Tex.**
- **Goldsmith sulfur plant, Goldsmith, Tex.**
- **Crane sulfur plant, Crane, Tex.**
- **Phillips Terminal Co., Houston Ship Channel.**
- **Vinylpyridine plant, Houston Ship Channel.**

Under construction:

- **Ammonia plant, Houston Ship Channel.**

Adjoining the Borger fractionator facilities are extensive treating facilities for production of specification of products free of sulfur and corrosive tendencies; cracking furnaces wherein paraffinic hydrocarbons are converted to olefinic; the only catalytic alkylation plant in existence for producing diisopropyl, which provides the highest quality blending stock for aviation gasoline, tetraethyl lead blending facilities and a vast storage and handling capacity for all the raw materials and products, including two underground caverns of about 60,000 bbl. each dissolved from salt 1,300 ft. below the surface.

Operations...

Philblack Plant

The process for the manufacture of furnace black from special blends of oil is indicated in accompanying process flow diagram. Philblack "A," a medium-abrasion furnace black which is used primarily in inner tubes, tire sidewalls and carcasses, and mechanical goods; and Philblack "O" which imparts greatly improved wear-resistance

properties to rubber for use in tire treads, are produced in facilities located at Borger. This plant is the world's largest producer of such black, producing approximately one-third of the total world's supply. Processing details vary somewhat depending on whether Philblack "A" or Philblack "O" is being produced.

The specially prepared oil feed stock is preheated to approximately 700° F. and is fed to the reactors where carbon black is formed by a control of oil and air rates. The reaction products are cooled from approximately 2,400° to 1,200° F. by direct water-spray injection which results in a reduction in secondary reactions. Further cooling to 500° F. is effected in atmospheric cooling pipe before the gas stream enters the Cottrell precipitator.

The combination of the Cottrell precipitator and cyclones results in agglomeration and separation of the black from the gas mixture. Collection efficiency with the precipitator and two-stage cyclone has been in the range of 90 per cent; however, installation of a tertiary cyclone collection stage has increased the percentage to 95 per cent. Further installations are to be made which will effect virtually 100 per cent recovery.

The remainder of the Philblack operation consists of micropulverizing the black and sending it through rotary mills for pelleting. Pelleted Philblack is shipped in bags or in covered hopper cars.

Butadiene and Copolymer Plants

Currently Phillips Chemical Co. operates for Reconstruction Finance Corp., Office of Synthetic Rubber, both of the government-owned butadiene and copolymer plants located in the Texas Panhandle. The butadiene facilities have a rated capacity of 56,200 short tons per year and the copolymer facilities have a rated capacity of 57,600 long tons per year.

Butadiene is produced through a two-stage dehydrogenation process involving four steps: (1) butane dehydrogenation, (2) butylene purification, (3) butylene dehydrogenation, and (4) butadiene purification.

Butane dehydrogenation . . . A special grade of butane which is better than 98 per cent pure by the freezing-point method is charged at the fresh-feed rate of 5,800 bbl. per day. After mixing with the recycle butane stream, the charge is vaporized in steam-heated shell-and-tube exchangers; the vapors are then sent to a preheater which is a tube-still heater operating at 1,100° F. At this temperature the material is passed through the catalyst cases. These are multitubular isothermal-type reactors consisting of tubes curved inward toward central headers in the form of a harp. There are 9 harps in each catalyst case and 32 tubes per harp.

Endothermic heat of reaction is supplied by flue gas from a Dutch oven. A blower is located at the end of the case. Excess flue gas goes to the waste-heat boiler and stack. Thirty catalyst cases are employed in five groups with one-half of these on dehydrogenation service, while the other half are being regenerated.

Time-cycle valves are employed on the inlet and outlet of the catalyst cases. Regeneration gas pressure is kept at about 100 psig. but during dehydrogenation the pressure is kept as low as possible. The regeneration pressure is bled out through the stack as dehydrogenation begins and is then built up when regeneration starts again.

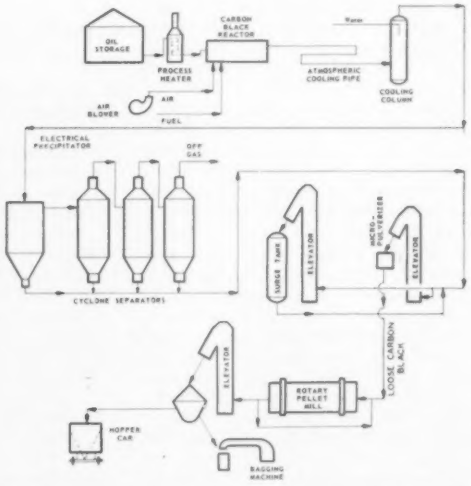
In a single pass 30 per cent conversion of butane is obtained with an efficiency or selectivity (butylene and butadiene production) of 80 per cent. Based on feed, 24 per cent goes to butylene and butadiene, 6 per cent to other products, coke and hydrogen, while some 70 per cent of the butane is unconverted.

The mixture of gases leaves the catalyst cases at 1,050° F. Water is injected at the outlet to quench the effluent stream down to 900° F. and it is further cooled to 550° F. after giving up heat to make 300-psi. saturated steam in the waste-heat boiler. Cooling with water spray in the quench tank cools the stream down to 120° F. The blower boosts it from 1 psig. to about 5-6 psig. after which it goes

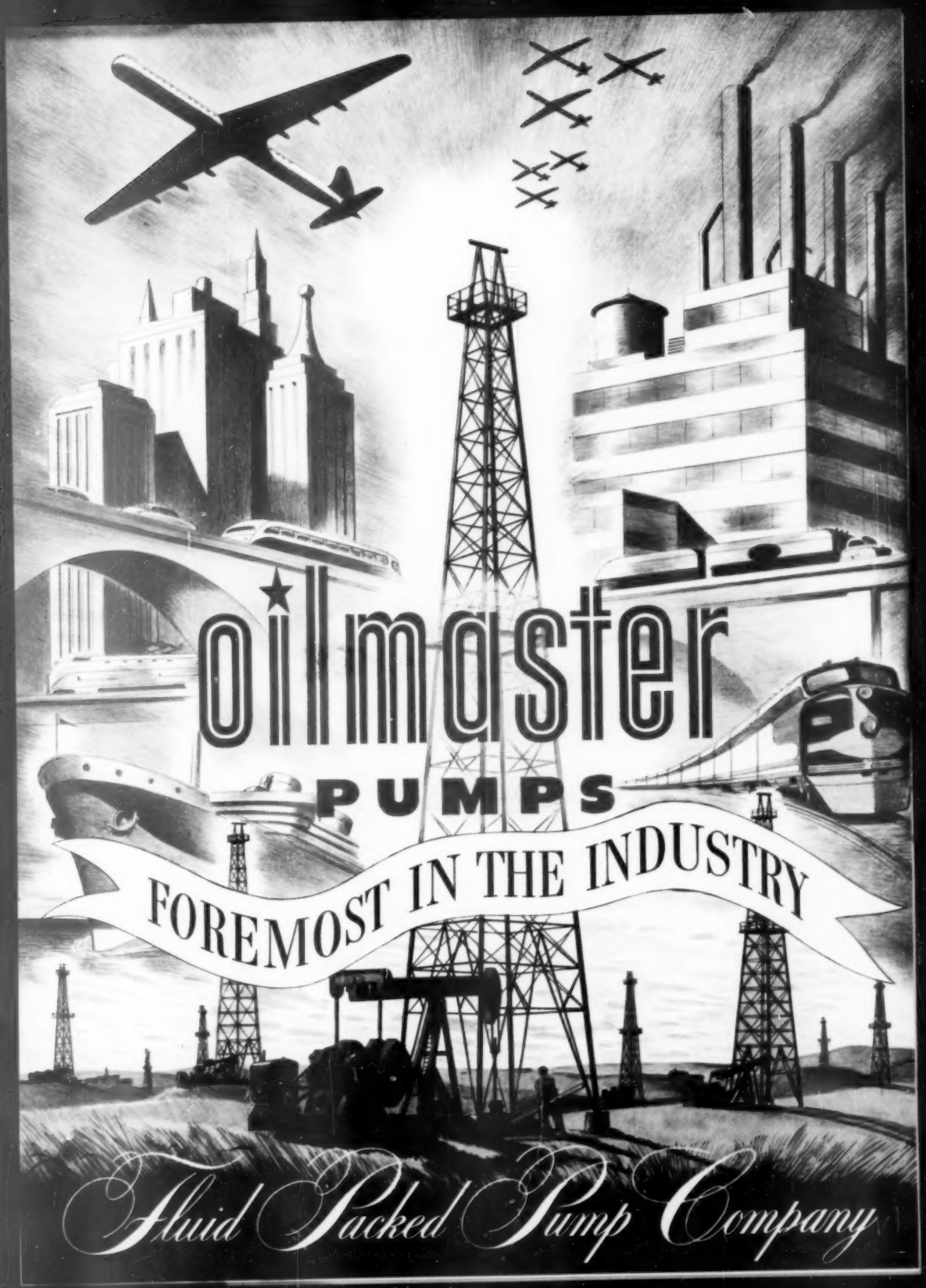
PHILBLACK PLANTS

Plant:	Feed stock	Product	Annual capacity
No. 1	Liquid hydrocarbon	Philblack A	119,000,000 lb.
No. 2	Liquid hydrocarbon	Philblack O	111,000,000 lb.
No. 3	Liquid hydrocarbon	Philblack O	60,000,000 lb.

Philblack plant, near Borger, Tex., world's largest producer of carbon black.



Flow diagram indicating process for the manufacture of furnace black at Borger.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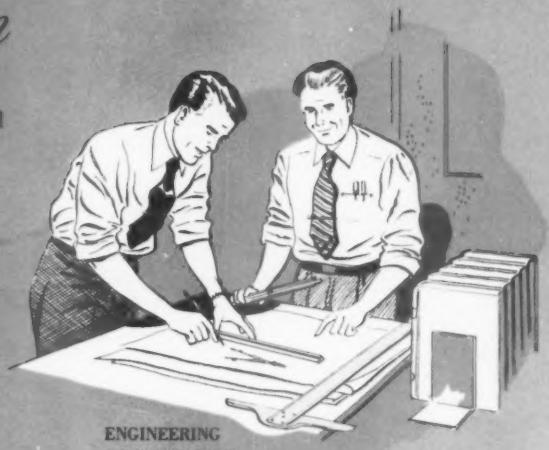

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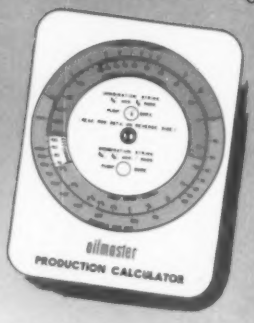
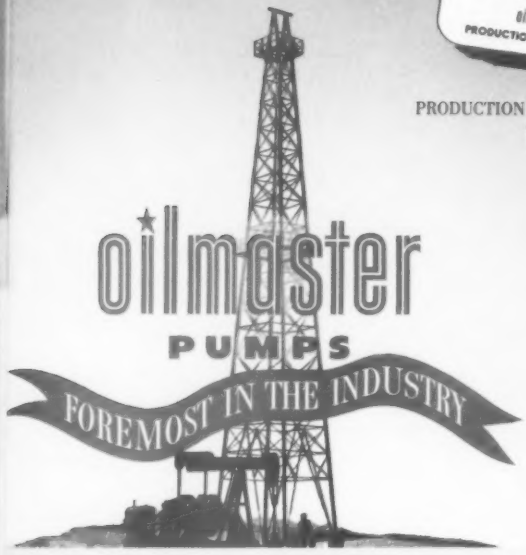


PRODUCTION CALCULATOR

INDIVIDUAL PUMP BULLETINS



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Fluid Packed Pump Company

Pyridine plant, recently completed at Adams Terminal, first plant to produce methyl vinylpyridine in large commercial quantities from petroleum raw materials by continuous process. This material will be used to produce a new synthetic fiber.

extraction in Step 2 an intermediate sample is taken off the twenty-eighth tray through an infrared analyzer which resets the flow of furfural feed to the top of the tower. This is a trim action working on about 5 per cent of the furfural feed rate.

In the Step 4 furfural extraction continuous sampling is carried out from the twenty-fourth tray through an ultraviolet analyzer with continuous recording which also resets the rate of flow of steam to the reboiler. Feed to these furfural absorbers is constant. (The sampling of the two absorbers by the ultraviolet is on a time cycle.)

Butene-1 column . . . A record of butadiene content is kept at the tenth tray by way of an ultraviolet analyzer. The flow of overhead make it set accordingly as a primary control. If the kettle product contains more than ½ per cent of butadiene, the overhead make rate is increased. As a secondary control, the reflux flow rate can be regulated off the liquid level in the overhead accumulator so that excessive amounts of n-C_4 are not permitted to leave the top of the tower.

For the butene-2 column an ultraviolet recorder analyzer samples from the twentieth tray. This is used as a guide by which to adjust the feed. If the percentage of butadiene in bottoms is too high the rate of flow of feed is reduced.

Butadiene tower . . . Purity of the make is controlled by regulating the rate of kettle product drawoff. An ultraviolet analyzer records on samples off the fifth tray. If the make stream drops below purity specifications, the bottoms withdrawal rate is raised. The analyzer serves to monitor butadiene losses in the kettle product, which are kept as low as possible to minimize the recycling necessary for recovery of the butadiene.

Nitrogen Facilities

Cactus Ordnance Works was leased from the U. S. Government in 1948 by Phillips Chemical Co. These facilities are located at Etter, Tex., about 68 miles north of Amarillo in the Texas Panhandle. Chemical Construction Corp. designed the plant. Natural gas is utilized to produce ammonia, a portion of which is converted to nitric acid which is combined with additional ammonia to produce ammonium nitrate in facilities owned by Phillips Chemical at this location. A portion of the remaining ammonia is shipped to Phillips' Adams terminal plant for ammonium sulfate manufacture and the remainder is sold "as such."

Ammonia manufacture . . . An accompanying process flow diagram indicates the facilities involved in the production of ammonia from natural gas. The processing may be divided into five operations. A brief description of each operation follows:

1. Gas reforming and carbon monoxide conversion:

The natural gas feed is treated to remove sulfur compounds, mixed with steam and fed to the primary reforming furnace, where the following principal reactions between the methane and steam take place over a catalyst:

$$CH_4 + H_2O \rightarrow CO + 3H_2$$

$$CH_4 + 2H_2O \rightarrow CO_2 + 4H_2$$

The product gases from the primary reformer are then mixed with heated air and passed over a catalyst in the secondary reformer, where the remaining methane is reformed. The gas, now consisting of hydrogen, nitrogen, carbon dioxide, and carbon monoxide, is then passed over a catalyst in the carbon monoxide converter, where a portion of the carbon monoxide is oxidized to carbon dioxide according to the following reaction:

$$CO + H_2O \rightarrow CO_2 + H_2$$

By these operations a maximum yield of hydrogen, the desired product, is obtained from the natural gas. The necessary quantity of nitrogen has, of course, been added at the secondary reformer in the form of heated air.

2. Compression:

Following reforming, the gas flows

NITROGEN PRODUCTS

Plant—	Feed stock	Product	Annual capacity
Etter	Natural gas	Anhydrous ammonia	160,600 tons
Etter	Ammonia	Nitric acid	80,300 tons
Etter	Ammonia and nitric acid	Ammonium nitrate	100,000 tons
Adams Terminal	Natural gas	Ammonia	152,000 tons
Adams Terminal	Ammonia and sulfuric acid	Ammonium sulfate	274,000 tons
Adams Terminal	Ammonia and acetaldehyde	Mixed pyridines	3,000,000 lb.

to the compression building where are located the low-pressure and intermediate-pressure compressors. Three stages of compression in the low-pressure units bring the gas to approximately 250 psi., at which point carbon dioxide is removed. Two more stages of compression in the intermediate pressure units compress the gas to about 1,800 psi., where follows carbon monoxide removal. The final stage of compression takes place in the synthesis building, where the pressure is raised to about 5,000 psi. for feed to the synthesis converters.

3 and 4. Carbon dioxide and carbon monoxide removal:

Synthesis gas at 250 psi. from the low-pressure compressors is scrubbed in two parallel units for removal of carbon dioxide. The major portion of the gas is handled through a Girbotol monoethanolamine unit, while the remainder is purified in a water scrubbing unit. The latter equipment has recently been installed as a supplement to the purification capacity and for standby purposes.

Carbon monoxide and the last traces of oxygen are removed from the synthesis gas after it has been compressed to 1,800 psi. in the intermediate gas with a cold solution of ammoniacal copper formate, and it results in a nearly pure synthesis gas containing three volumes of hydrogen to one volume of nitrogen.

5. Ammonia synthesis:

The synthesis gas after compression to 5,000 psi. is passed over a catalyst in the ammonia converters where the following exothermic reaction takes place:

$$N_2 + 3H_2 \rightarrow 2NH_3$$

The effluent gases are cooled to condense and separate the liquid ammonia product, and the unreacted gases are then recycled back to the converter inlet. Product is sent to storage, which consists of low-pressure spheres. Tank car and tank truck, as well as cylinder-loading facilities, are provided for final disposition of the product.

Nitric acid manufacture . . . Briefly, the nitric acid process consists of burning ammonia with air over a platinum catalyst and absorbing the resultant oxides of nitrogen in water. The following are the major items of equipment and their functions:

1. Air compressors and ammonia vaporizers for preparation of feed stock.

2. Converters, where the ammonia is oxidized:

$$4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$$

3. Cooler condensers, where the gases are cooled and the nitric oxide is oxidized to nitrogen dioxide:

$$2NO + O_2 \rightarrow 2NO_2$$

4. Absorber, where nitric acid of 55 to 60 per cent strength is produced by reaction of nitrogen dioxide and water:

$$3NO_2 + H_2O \rightarrow 2HNO_3 + NO$$

4. Power recovery compressors, where supplemental primary air is obtained through recovery of power from the pressure of effluent gases off the absorbers.

Ammonium nitrate manufacture . . . The process for producing prilled ammonium nitrate consists of the neutralization reaction between nitric acid and ammonia, concentration of the resultant liquor, spray cooling in the prilling tower, and final drying and preparation of the product for sale. Clay is added to the prills in the final processing step in order to assure a free-flowing product, and after bagging in automatic bagging machines, the product is either loaded into box cars or sent to warehouse storage.

Nitrogen solutions are prepared by mixing ammonia and water in the proper proportions with a stream of ammonium nitrate solution taken from the neutralizer.

Pyridine plant . . . Phillips Chemical Co. is now constructing a plant at Adams terminal that will produce from acetaldehyde and ammonia 2 million pounds per year of methylvinylpyridine and about 1 million pounds per year of related pyridine products. The vinylpyridine will be used in the manufacture of a new synthetic fiber. This fiber will be woven into fabrics that can replace wool and other scarce materials required in the production of clothing, uniforms, tents, upholstering, and various industrial items.

Sulfur Plants

Phillips Chemical Co. commenced operation of the Goldsmith sulfur-extraction plant on February 18, 1952. Construction of this plant was begun in May 1951. The new plant, located in Ector County in the Permian basin oil fields of West Texas, is designed to recover nearly a quarter million pounds of elemental sulfur per day from hydrogen sulfide, formerly a waste product, removed from raw casing-head gas. The output from this new sulfur plant, after being converted to sulfuric acid by a sulfuric acid manufacturer, is utilized in the production of ammonia sulfate fertilizer at the Phillips Chemical Adams terminal plant near Houston.

In the first step of the sulfur-recovery process a portion of the hydrogen sulfide is burned to sulfur dioxide and, at the same time, steam for plant use is generated from the heat liberated during combustion. The second step is the catalytic reaction of the sulfur dioxide with the remaining hydrogen sulfide to form elemental sulfur in vapor form. The third step involves cooling, condensing, and separating the sulfur vapors from the gas stream. The sulfur produced is maintained at a temperature above 230° F. in liquid form and is stored in tanks and transported to market in tank trucks and tank cars as any other ordinary liquid.

Phillips Chemical Co. completed during August 1952 a second sulfur-extraction plant in Crane County, Texas, which is designed to produce over 100,000 lb. of elemental sulfur per day utilizing essentially the same process in operation at Goldsmith. Phillips Chemical Co. is also formulating plans for the erection of additional sulfur plants in the West Texas-New Mexico area.

BOOK

REFERENCE REPORT ON THE OIL AND GAS FIELDS OF THE TEXAS UPPER GULF COAST, TEXAS RAILROAD COMMISSION DISTRICT 3. By Frank J. Gardner. Published by Five Star Oil Report. 484 pp. $25.

This is a book covering the study of the petroleum industry in the Texas counties of Austin, Brazoria, Brazos, Burleson, Chambers, Colorado, Fayette, Fort Bend, Galveston, Grimes, Hardin, Harris, Jasper, Jefferson, Lee, Liberty, Madison, Matagorda, Montgomery, Newton, Orange, Polk, San Jacinto, Trinity, Tyler, Walker, Waller, Washington, and Wharton. The report is a complete compilation of statistical and historical data including all petroleum development in the area up to January 1, 1952. It includes 71 structural maps, 81 detailed illustrations, covering 427 oil and gas fields. First statistical data listed is a summary of the petroleum industry in District 3 giving (1) total number of oil and gas fields discovered, number of producing oil wells and gas-condensate wells, total monthly oil production, reserves of petroleum products, and cumulative recovery of oil in the United States, in Texas, and in the Texas Upper Gulf Coast; and (2) proration and conservation of oil fields, giving a brief history, basis, and methods used for proration and conservation by the commission. A complete list of oil and gas fields with cumulative production and numbers of producing wells is presented in alphabetical order. There is also a breakdown of each county followed by a resume of the fields in the county with such data as discovery well, site, productive formations, cumulative figures through 1951, etc. Included in each county section are scale maps and correlative charts of important areas.

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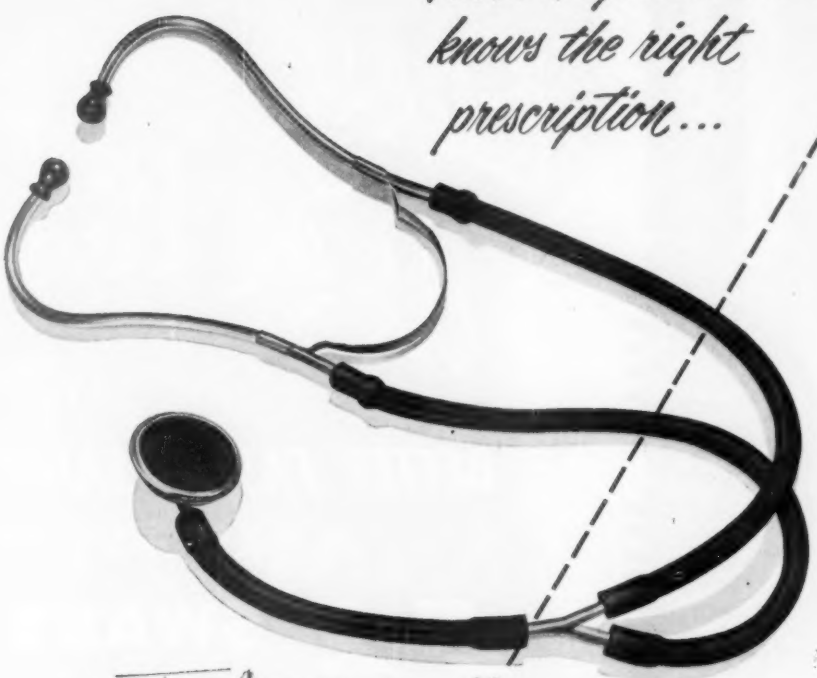

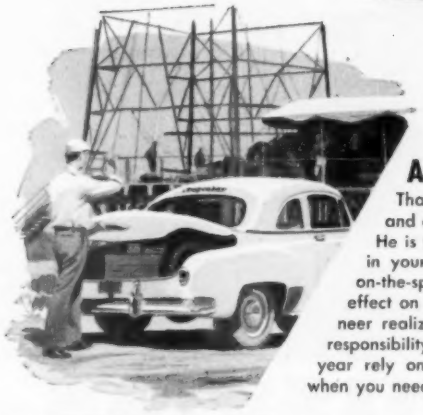

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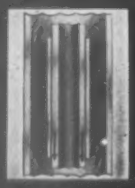
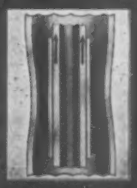
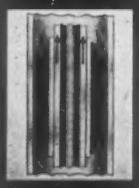


On the down stroke fins are in normal upturned position, allowing E-Z Swab to fall free.

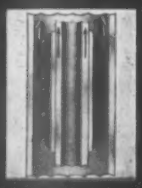
Flexibility of fins allows EZ Swab to pass smoothly through tight spots on up or down stroke.

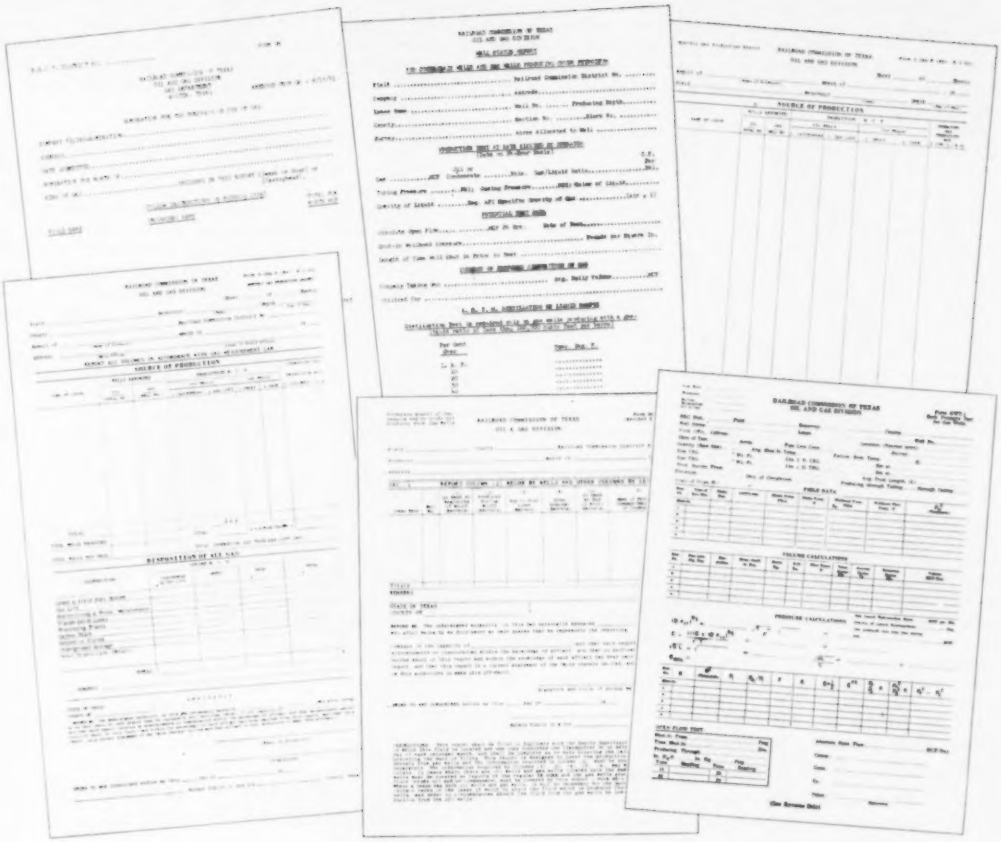




E-Z Swabs automatically by-pass fluid overload. Each rubber will lift approximately 400 feet of fluid. Rubber fins bend down and unload excess fluid.

After overload fluid is passed, fins spring up and seal against tubing.





DETERMINATION OF POTENTIALS and allowables for gas wells is a difficult conservation problem. The above forms are typical of those which are executed to aid the Texas Railroad Commission in making these decisions.

JOURNAL REPORT: How Texas Railroad Commission Operates; Its Rules, Regulations

2. GAS-WELL POTENTIALS AND GAS ALLOWABLES

by Roy F. Carlson
West Texas District Editor

GAS-WELL potentials and allowables provide the Texas Railroad Commission with perhaps its most difficult problem in oil and gas conservation. At one time it was possible and feasible to measure the ability of a gas well to produce by permitting it to produce into the atmosphere at its full potential.

Discovery of extremely high-pressure fields, however, made this method of testing gas wells virtually impossible, and extremely undesirable from a conservation standpoint because of the vast amount of gas that would be vented during measurement. The large volumes produced would be dangerous also.

With progress in pipe-line techniques, and subsequent installation of long-distance lines exporting gas from Texas into other states, gas has constantly increased in value as a resource, bringing more and more attention to its production and conservation by the Railroad Commission, and other agencies in Texas. This attention has caused constant revision of rules governing gas production.

This is No. 2 article of an important series by the Journal's West Texas district editor. No. 1 was on "Drilling-Producing Regulations of Texas Railroad Commission," November 24, 1952, issue. Reprints (gratis) are available from Reader Service Department.

Basically, however, gas production is regulated by the Texas Railroad Commission under its Rules 24 and 25. These do not cover completion of the wells, this regulation being provided in other rules covering the drilling of wells for either oil, gas, or both. They do provide, though, for measurement of the gas well's ability to produce, and provide for the allocation of production to that well.

The commission has also ruled that distillate or condensate wells are gas wells. These wells are termed those that produce hydrocarbon liquids which are condensation products from the gas phase at the well head and which do not produce more than 1 bbl. of crude oil per 100,000 cu. ft. of gas. Crude oil here does not include liquids existing in the reservoir in a gas phase.

Rule 24—Gas Well Open Flow

In brief, Rule 24 provides that the absolute daily open-flow potential of each producing gas well, except those with allowables restricted under other rules, shall be ascertained by each owner or operator semiannually during the months prescribed by the deputy supervisor in charge of the commission district in which the well is located. A back-pressure test in accordance with the instructions contained in the commission publication, "Back - Pressure Tests for Natural-Gas Wells, State of Texas" shall be made after the completion of every gas well and before any gas is produced therefrom for any purpose. This test is to be followed if the well is producing, except for those restricted under other rules, by the taking of a shut-in well-head pressure which will be used to adjust the previously determined potential by the method prescribed by the commission.

Thereafter, a back-pressure test shall be made on each producing gas well annually followed in approximately 6 months by an adjustment of its absolute open flow to its current shut-in well-head pressure. All tests shall be made under the supervision of the commission's engineering department and the district office of the commission shall be notified at least 24 hours prior to any back-pressure test. Tests of wells connected to a pipe line are to be made in such a manner that no gas is flared. All tests shall be made effective for the purpose of determining allowables on the first day of the month following the test period designated by the deputy supervisor of the commission district in which subject wells are located.

Rule 25—Gas Flow Not Over 25 Per Cent

When the gas from any well is being used, the flow or production thereof shall be restrained to 25 per cent of the potential capacity of the same; that is to say, in any day the well shall not be permitted to flow or produce more than one-quarter of the potential capacity thereof as shown by the determination of potential provided for in Rule 24, provided that this rule shall not apply to casing-head gas, and provided further that in cases of emergency, greater production may be used after special authority therefor has been secured from the Railroad Commission of Texas. Applications for exception to this rule must be made to the Railroad Commission within 30 days after effective date of this order, where more than 25 per cent of the potential capacity is now being used. Thirty days from date will be given to secure permits for such special authority for exceptions to the rule.

Amendments to both these rules have been suggested by the Railroad Commission and by gas-producing companies, but these have not been acted upon as yet. One of the chief reasons for changing the rules has been lack of a positive concrete method of determining "potential" of a gas well. The back-pressure tests are as good as have been devised, but even this test upon occasion gives results that are obviously erroneous.

Gas-Well Reports

An organization drilling and completing a gas well must, of course, file many of the reports required of an oil-producing company, including such reports as the organization report or Form 7, application to drill, casing test, plugging reports, and well-treating reports. When the well is completed, however, different reports are required.

Form GWT-1 . . . Whether the well produces dry gas or distillate and gas, it is treated as a gas well, and requires the filing of a Form GWT-1. This report records results of the Back-Pressure Test for Gas Wells, and must be filed before any gas is produced from the well. It is on the basis of results of this test, as reported on this form that potential of the well is determined, and on which allowable is assigned to the well in relation to other wells in the same field. This test also determines a curve which is used for adjustment of well potentials throughout the life of the well.

Each 6 months, at a time prescribed by the deputy supervisor of the district in which the well is located, a shut-in pressure must be taken at the well and must be reported to the commission on the proper form. This shut-in pressure is used to adjust the allowable of the well on the basis of its potential and its potential curve as previously established. Some suggested procedures for the taking of such pressures and back-pressure tests are given later in this report.

Form 3-266 A and B . . . A detailed report on the production and disposition of all gas produced from a gas well must also be submitted to the commission on Form 3-266 A and B. A separate report must be filed monthly by reservoirs, and reported on the form by lease and well number.

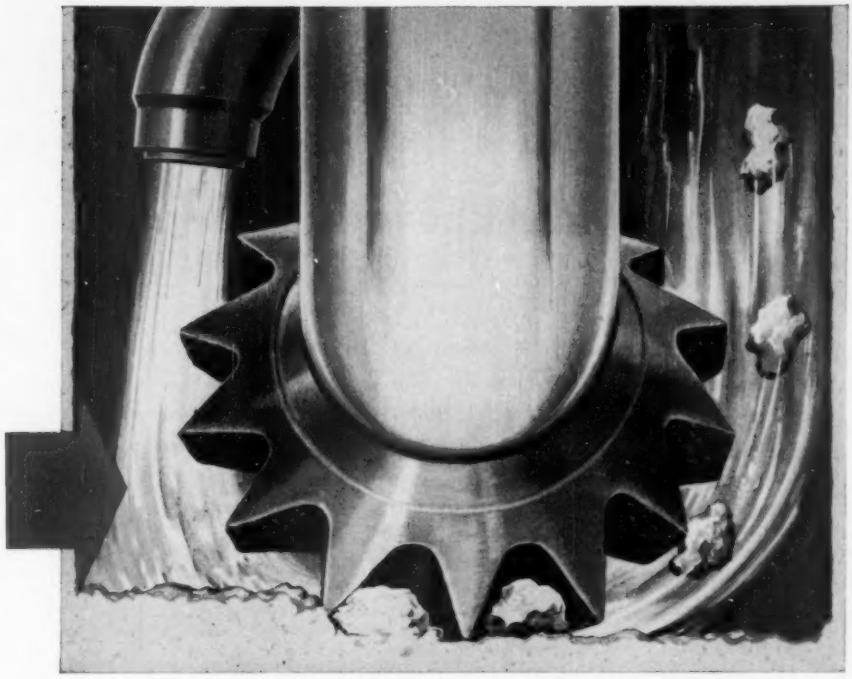
All volumes of gas produced must be reported regardless of the disposition of such gas. This report is also filed for oil wells producing gas incident to oil production.

Form GN . . . Another necessary report is a nomination for the purchase of gas. This report, on Form GN, is normally filed by gas pipe-line purchasers of natural gas, but in the event the operator uses gas for his own operations either on leases or in a fuel system, the report must be filed. The report is filed directly with the Austin office of the commission so that it reaches that office on or before the ninth of the month prior to the month for which the nomination is made. Separate reports are required, by Railroad Commission districts, and requirements from each field must be indicated. A separate report must also be filed for sweet, sour, or casing-head gas.

Form GO-1 . . . An accounting of crude oil or condensate produced from gas wells must be made by gas producers to the commission via Form GO-1. Oil or condensate produced must be reported from each well and where oil and gas wells exist on the same lease, oil from the gas wells is reported on Form GO-1, and oil from the oil wells is reported on Form EB. Separate storage must be provided for the oil from the gas wells on the lease. The report must be filed on or before the fifteenth of each month for the month immediately preceding.

The condition of a gas well producing condensate or crude oil must also be reported to the commission by the Well Status Report for such wells.

Other rules that have been promulgated by the commission through special orders are in effect but are held on open docket in the event that needed changes evidence themselves. Some of the rules in effect, including those above and others, are that no well producing both oil and gas shall be permitted to produce in excess of such



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This fast removal of cuttings means that cutter teeth are always working on new formation. The result is faster drilling, more hole per bit, fewer round trips and lower drilling costs.

REED Roller Bit Company
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PELTON *here's where long stroke hydraulic pumping belongs*

The economics in favor of Long Stroke Hydraulic pumping are most outstanding where pumping loads are heavy. Wherever oil potential is great, deep wells or shallow wells, Pelton Long Stroke Units pay off quickly. THE REASON: Effective stroke at the bottom hole pump after rod stretch permits use of a pump barrel 10 to 30 ft. in length. Long, slow strokes reduce fluid velocity through the standing valve resulting in higher volumetric efficiency. This aids in handling gassy or sandy fluids. Soft rod reversals prolong sucker rod life 6 to 8 times.

Check the application chart below. If your wells fit somewhere within the pattern shown, you will find Pelton Long Stroke Hydraulic Pump Jacks the real answer to more oil at less pumping cost.

Send for our application data sheet on which you can give us the well information necessary to determine the correct model and price of a Pelton Unit for your job—no obligation whatever.

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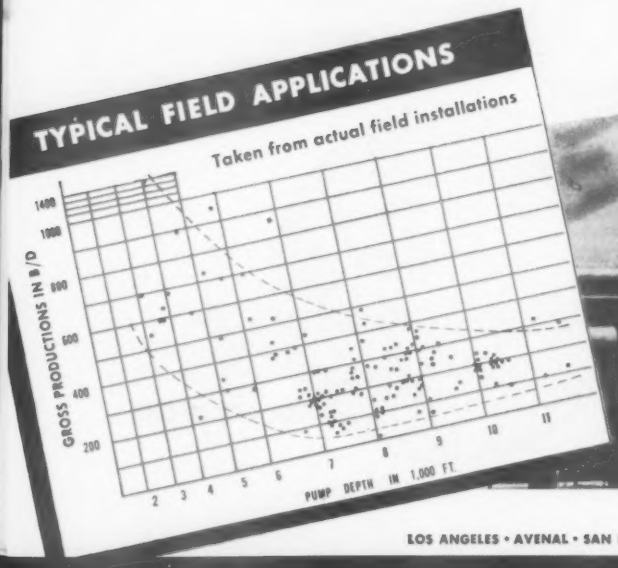

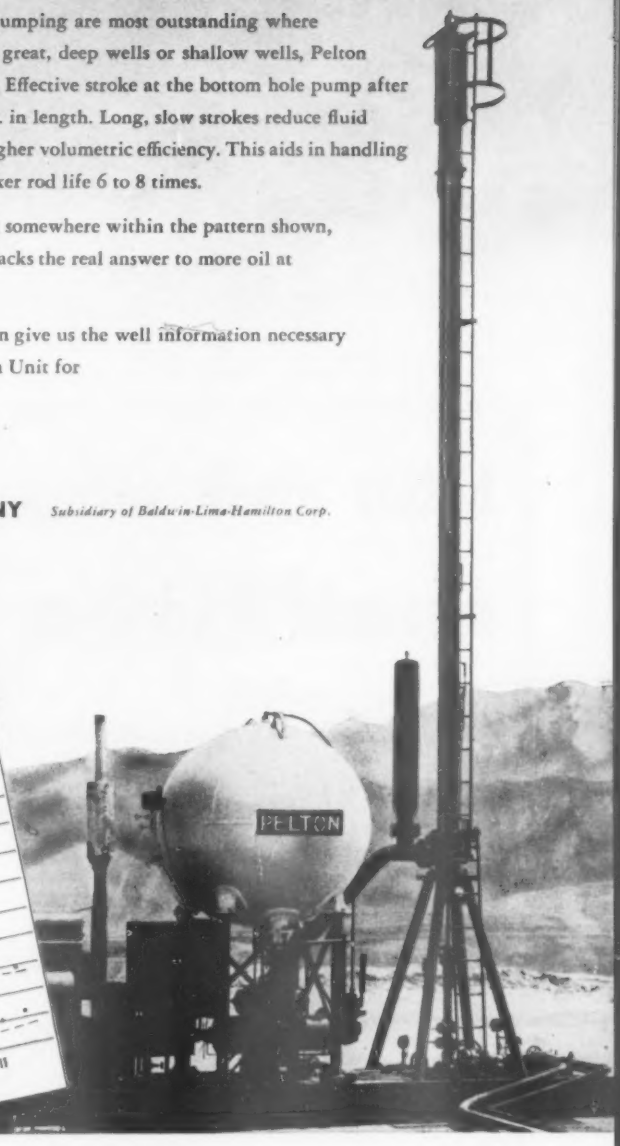

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gas-oil ratio as is specified by the commission.

Reasonable market demand for gas is also determined by the commission by nominations of purchasers in order that an over-all demand may be established on which to allocate production. Production is allocated by dividing the reasonable market demand into two parts, and these parts are distributed to each well in proportion to the acreage attributed to that well, and its producing ability.

Production is allocated on a 50-50 basis between acreage and the well. Wells on tracts smaller than the proration units are given their acreage allowable while wells on tracts larger than the proration units receive only the allowable granted to the proration unit. Acreage is divided evenly between wells on tracts with two or more wells on them.

Equipment . . . All gas that is produced must be measured in accordance with standard practices. No gas is permitted to be produced from two different strata through the same production string. Also, use of any kind but sour gas for the manufacture of carbon black is prohibited.

Allowable

By order of the legislature of the State of Texas, the Railroad Commission may permit over and underproduction of gas wells if no waste is occasioned, provided certain provisions are followed. Over and underproduction is referred to 6-month units during which time overage and underage may accumulate. No well, however, is permitted to produce in excess of twice its monthly allowable or to produce at a rate in excess of 25 per cent of the daily productive capacity of such well as determined by the commission, whichever is the smaller.

When any well has produced twice its allowable for 6 or more successive months, it shall be closed in until production and allowable are in balance, or if the reservoir would be damaged by complete shut in, the well may be permitted to flow a fractional part of its allowable until such overproduction is made up. On the first day of March and September, which are the first days of the 6-month balancing periods, production from overproduced wells is restricted to such an amount that at the beginning of the next balancing period the production is in balance.

A well that is underproduced during any 6-month balancing period may make up its production during the next 6 months, provided it does not produce over 25 per cent of its potential or twice its daily average rate during the period of underproduction, whichever is smaller. A well underproduced during two successive balancing periods cannot be assigned an allowable greater than the maximum monthly production had from that well during the immediately preceding balancing period. Adjustment may be made on this provision to take care of increased productivity due to workover or like results.

Test Recommendations

The back-pressure tests required by the rules covering gas production is thoroughly described in the booklet named above. Basically, the tests at the surface of pressure, temperature, and volume are made to determine values of shut-in pressure in the formation and working pressure at the sand face for various rates of flow. The results of the test are used to establish a curve of the difference between the squares of these two pressures plotted against the various rates of flow. The absolute open-flow potential therefore is determined from the curve by the square of the shut-in pressure, taking the sand face working pressure to be zero at that rate of flow. This method should apply throughout the life of the well.

At least four test measurements are made on a well at four rates of flow, this being done so that a straight line can be drawn on log-log paper through three of the points. There are instances, however, where a straight line cannot be obtained.

This method of determining deliverability of a well includes recommendations from several sources, including the Bureau of Mines and several of the major oil and gas companies. Procedures to follow are given along with the test description, and some of these follow.

If the well has a pipe-line connection, it should be produced at its average daily rate of flow for 24 hours prior to the shut-in period in which the buildup pressure is obtained. Also, the well should be shut in for a period of 24 hours before potential testing begins.

The shut-in pressure at the well head should be taken with a deadweight gage, and all other pressure readings of flowing pressure should also be taken with a deadweight gage. This is advisable since a very small error in pressure measurement can be magnified in calculating potential.

The first rate at which the well is produced during the potential test should be large enough to lift all fluid from the well bore, and it should be the lowest of the series of rates used during the test.

If possible, the well-head pressure should be lowered at least 25 per cent below shut-in well-head pressure during the test. It may be that just the tested well can be producing into a pipe line during the test.

Diameters of the meter run and the orifice should be closely measured, and recording devices should be zeroed and checked. Pressure readings at the well head should be taken at about 15-minute intervals so that stabilization in the well may be noted. And if a well producing liquid, the gas-liquid ratio should be determined at close intervals to determine if it has stabilized.

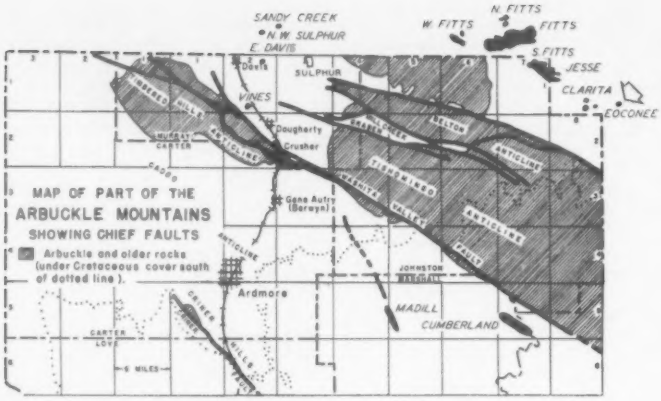
Under flowing conditions the pressure may be considered stabilized when measured pressure values do not vary more than 0.1 psi. during a 15-minute interval. In the event that stabilization as described does not occur, the rate of flow or length of test should be limited to 4 hours.

At least four rates of flow and four corresponding stabilized pressures should be taken on each test in order that a back-pressure curve may be drawn through three points at least. All variations from perfect gas laws should be included in calculations. A back-pressure curve with a slope in excess of one will not be accepted by the commission. When a curve of this kind is obtained as a result, the well should be retested to determine whether or not a more accurate can be obtained.

Upon retesting, if points do not align or have the proper slope requirements, then a line with a slope of one should be drawn through the point determined by the highest rate of flow, and the potential determined from this curve. All necessary data required from calculation of the test should be available in the field so that the required calculations may be made as the test progresses.

Upon completion of the test a Form GWT-1 must be filed and accompanied by a back-pressure curve on log-log graph paper. Two copies of the data sheets together with the curve should be mailed to the commission district office in which the gas well is located.

Purchasers of natural gas in the State of Texas must also report the activities of the company that apply to distribution and movement of natural gas in and from that state. The organization report or Form 7 is, of course, required, and a permit must be applied for on Form 13 and granted by the Railroad Commission. A monthly report of gas exported from Texas must be given the commission, and a monthly submission of Form GN, the nomination for the purchase or use of gas well gas is also required, as described previously.

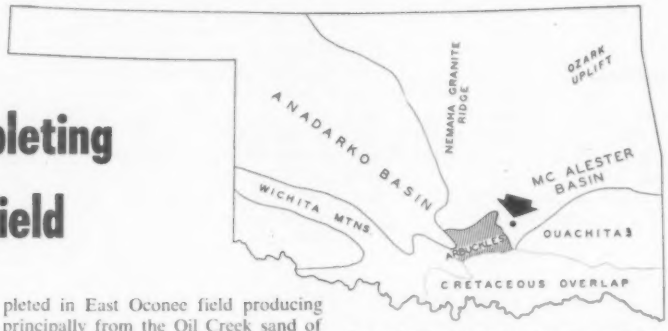


IN THE ARBUCKLE FOOTHILLS lies East Oconee field shown by arrow at the upper right-hand corner. (Courtesy A.A.P.G.)

Contractors drill straight bore holes in thick Pennsylvanian shale bodies using few drill collars and keeping weight on bit low in development of rich oil reserve in foothills of Arbuckle Mountains.

by Joseph A. Kornfeld
Mid-Continent District Editor

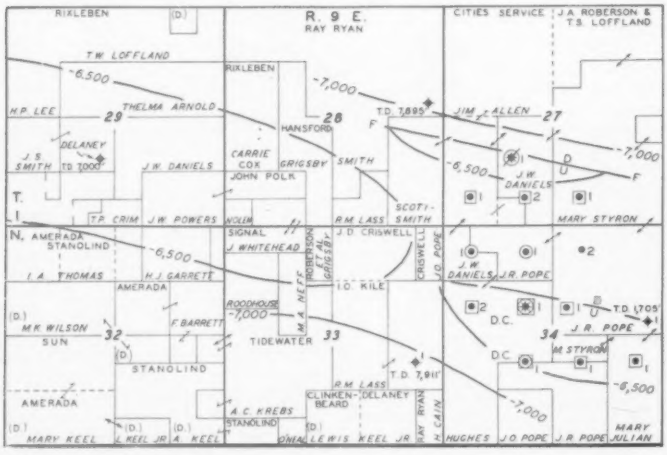
Drilling and Completing In East Oconee Field



REGIONAL POSITION of East Oconee field is shown by solid arrow.

STRAIGHT-HOLE drilling in highly faulted anticlines and horsts in the foothills of the Arbuckle Mountains of East Central Oklahoma presents real problems to drilling contractors. This condition is particularly true in the development of East Oconee field of Coal County which lies at the western rim of the McAlester basin.

To date there are 12 oil wells completed in East Oconee field producing principally from the Oil Creek sand of the Simpson series found at a depth of about 7,500 ft. Through two dual completions, gas and oil are also produced from the Second McLish sand found at about 7,100 ft. Present attributable proved developed acreage is about 480 acres. Ultimate productive acreage may cover as much as 680 acres or greater.



SUBSURFACE STRUCTURE contour map of East Oconee field as mapped on top of the Second McLish sand. Contour interval is 500 ft. (Courtesy Midcontinent Map Co., Tulsa.)

Drilling Contractors

Drilling contractors who have been active at East Oconee field include Loffland Brothers Co., Tulsa; Roberson Drilling Co., Tulsa; Sikes & Burckhalter, Wichita Falls, Tex., Fleet Drilling Co., Ada, Okla., and Mora Drilling Co., Tulsa.

Loffland Brothers Co. drilled three wells at East Oconee field in the following sequence: 1 Hughes, C SE NW 36-1n-9e; 1 Mary Stryon, C SW SE 27-1n-9e, and No. 2 Pope, C NE NW 34-1n-9e. This firm employed its Rig No. 135 mounted on a 136-ft. steel derrick equipped with an 8 by 26-ft. substructure rated at 800,000 lb. capacity. The draw works is driven by three gas-driven engines each with a continuous rating of 240 hp. These also drive two triplex mud pumps. In the cellar are mounted two 6,000-lb. blowout preventers.

Structural Geology

Subsurface structure of East Oconee field is that of a broad horst lying at the extreme western depths of the McAlester basin and in the foothills of the Arbuckle Mountains. Major axis of the

One-piece packing rubber molded from special compound gives positive pack-off, yet pulls easily and will not vulcanize to casing wall.

Two-piece "G2" rubbers with metal spacer are interchangeable and optional at no extra cost.

CIRCULATE ABOVE THE PACK-OFF WITH THE GUIBERSON *KV30P*

Perforated-Mandrel Control Head Packer

The KV30P is designed especially with a perforated mandrel for free fluid circulation ***ABOVE*** the packer when valve is open. Special seal in shell prevents circulation through the packer shell. Positive pack-off is obtained when valve is closed. Two independent sealing elements in the valve, a tapered metal valve and seat and a set of oil-resistant seal rings, afford double-sealed protection.

Both the KV30P and the regular KV30 allow a 30″ opening valve stroke before packer setting is disturbed. Use the KV30 or the KV8 for standard below-packer circulation. The KV8 is the same packer as the KV30 but with 8″ valve stroke. All three packers have the same husky construction, varying only in point of circulation and length of valve stroke.

With these KV Packers you can *conserve* gas pressure... *extend* the flow life of your well and produce at *lower lift cost*.

Better Be Safe Than Sorry!

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horst is generally west-northwest to east-southeast.

As contoured on the top of the Wapanucka limestone, the structure exhibits a maximum structural closure of the order of 727 ft. However, on top of the McLish dolomite, the maximum structural closure is as great as 1,019 ft.

The Second McLish sand reservoir is found as several local accumulations on the south upthrown side of individual fault blocks occurring within the major horst itself. These fault blocks have resulted in local gas caps with oil rims within the Second McLish sand, i.e., Coal Oil & Gas Co. 1 Daniels, SW NE SW 27-1n-9e, abandoned gas well, and Coal Oil & Gas Co. 1 Hughes, C SE NW 34-1n-9e, a gas well in the Second McLish sand dually completed with an oil-zone completion in the Oil Creek sand.

Hughes well . . . This well was spudded on November 16, 1950, and reached total depth of 7,521 ft. on March 6, 1951. A single 12¼-in. bit was used to cut the surface hole in which was run 333 ft. of 10¾-in. pipe cemented with 300 sacks. The shoe was drilled with a 9-in. bit and long hole was cut to total depth where 7-in. pipe was run to 7,520 ft. Behind the pipe were placed 350 sacks of cement. Four squeeze jobs were required in the Oil Creek sand before successful completion was made. Drilling mud was displaced with water for final completion.

1 Mary Stryon . . . Drilling surface hole on this well varied from other operations in the field in that the original surface hole was cut with a 12¼-in. bit to 382 ft., then reamed out to 13¾ in. to a depth of 342 ft. and the 10¾-in. pipe was set 9 ft. off of the latter depth and cemented with 250 sacks.

The shoe was drilled with a 9⅞-in. bit; 57 bits of this size and 3 rerun bits were employed in cutting long hole to the Oil Creek reservoir. A single 7⅝-in. core bit was used to cut an 11-ft. core from 7,505 to 7,516 ft. Seven-inch casing was set at 7,522 ft. and cemented with 350 sacks.

Only one squeeze job was necessary through perforations. After cement plug was drilled out, mud was conditioned, production packer set, and well completed through tubing flowing into tanks. No difficulty was encountered in drilling a straight hole. Maximum deviation was 1¾° measured at 4,748 ft. and later at 6,530 ft.

2 Pope . . . Surface hole was cut with a 13¾-in. bit and 10¾-in. surface pipe set at 330 ft., and cemented with 350 sacks. Only 56 9⅞-in. rock bits were used in cutting the long hole to total depth of 7,453 ft. where the 7-in. pipe was run and cemented with 350 sacks.

Six conventional cores were cut with core heads ranging from 7⅝ to 8⅝ in. Recoveries are tabulated elsewhere in this article. Bore-hole deviation did not exceed 1½°. This deviation was first observed from 1,604 ft. and held at that angle to 3,203 ft. At that depth survey showed the hole to be only 1¼° off vertical. In the interval from 4,110 to 4,325 ft. the deviation was only 1½°. From that depth until 7,453 ft., total depth, deviation was less than 1½°.

Sikes & Burckhalter, Wichita Falls, drilled two wells in East Oconee field as follows: 1 Pope-Stryon, C NW SW 34-1n-9e, and 1 Hughes-Pope, C NE SW 34-1n-9e.

This firm employed a rig mounted on a 131-ft. steel derrick equipped with a 9-ft. substructure. The draw works and the pump were driven by two V-12 engines.

This contractor laid a 2-in. water line to Clear Boggy Creek near the field to supply the rig with water. Drill-

CASING AND CEMENTING PROGRAM, EAST OCONEE OIL FIELD, OKLAHOMA

	Size (in.)	Seat (ft.)	Cement (sacks)
Surface	10¾	322	300
Long	7	7,528	350

SUMMARY OF CONVENTIONAL CORING PERFORMANCE, COAL OIL & GAS CO. 2 POPE, C NE NW 34-1n-9e, EAST OCONEE FIELD, COAL COUNTY, OKLAHOMA

(Loffland Brothers Co., Tulsa, drilling contractor)

Core sequence	Diameter, in.	Interval cored, ft.	Total ft. cut	Recovery	
				Feet	Per cent
No. 1	8⅝	7,118-7,122½	4.5	3.4	75.6
No. 2	7⅞	7,122½-7,129½	7.0	6.6	94.2
No. 3	8⅝	7,395-7,415	20.0	19.5	97.4
No. 4	7⅞	7,415-7,422	7.0	(?)	
No. 5	7⅝	7,422-7,433	11.0	7.5	68.2
No. 6	7⅝	7,433-7,448	15.0	10.0	66.6

SUMMARY OF DRILLING PROCESSES, RAY RYAN 1 ALEXANDER, C SE NE 28-1n-9e, EAST OCONEE FIELD, COAL COUNTY, OKLAHOMA

(Fleet Drilling Co., Ada, Okla., drilling contractor)

Depth, ft.	Bore-hole deviation, degrees	Formation	Mud properties— Weight, lb./gal.	Visc. sec. A.P.I.	Mud-pump pressure psig.
70		Red bed; sand	Water		200
400	¾	Sandy shale	Water		200
800	1½	Sand; shale	Water		250
1,000	1½	Sandy shale	Water		250
1,300	2	Sandy shale	Water		250
1,400	2¼	Shale	Water		250
1,500	2¼	Shale	Water		275
1,700	1½	Shale; sand	Water		275
2,000	1¼	Shale	Water		275
2,200	1½	Sandy shale	9.2	38	300
2,400	1¼	Sand; shale	9.2	32	300
2,600	1½	Sand; shale	9.4	32	350
2,700	1	Shale	9.5	32	350
3,000	1	Shale	9.7	42	375
3,100	¾	Shale	9.8	46	375
3,300	¾	Shale	9.9	52	375
3,400	1	Sand	9.7	52	400
3,500	1	Sand; shale	9.9	50	400
3,600	2	Sand; shale	10	55	425
3,700	1½	Sand; shale	10	75	425
3,900	1½	Sand; shale	9.9	69	450
4,100	1¼	Sand; shale	9.8	75	500
4,200	1¼	Shale	9.8	74	500
4,400	1	Shale; lime	9.6	80	500
4,500	1	Shale	9.7	94	500
4,600	1¾	Sandy shale	9.7	70	525
4,700	1¾	Sandy lime	9.6	94	525
4,800	1½	Sandy lime	9.7	88	525
5,000	1¾	Sandy lime	9.8	78	525
5,100	2	Shale	9.8	107	550
5,200	1¾	Shale	9.8	104	550
5,300	1¾	Shale	9.9	114	550
5,500	1¾	Shale; lime	9.8	121	575
5,600	2	Shale; lime	9.7	132	575
5,700	2¼	Lime	9.8	125	575
5,800	2¼	Shale	9.8	118	600
5,900	2½	Shale	9.8	128	600
6,100	2½	Shale	9.7	128	600
6,200	2	Shale	9.7	142	600
6,300	2¼	Shale and lime	9.8	136	600
6,400	3	Shale	9.7	148	625
6,500	3½	Lime	9.7	153	625
6,700	3	Shale; lime	9.9	160	625
6,900	3½	Lime	9.8	130	650
7,000	3¼	Lime	9.7	118	650
7,100	2½	Lime	9.8	197	650
7,200	1¾	Lime	9.5	183	675
7,300	1½	Lime	9.4	160	675
7,400	1¾	Shale	9.5	103	675
7,500	1	Shale	9.7	120	675
7,600	1¾	Shale; lime	9.7	122	700
7,800	1¼	Lime	10.1	200	700
7,850	½	Sand	10.2	271	725
7,895	½	Sand	10.1	320	725

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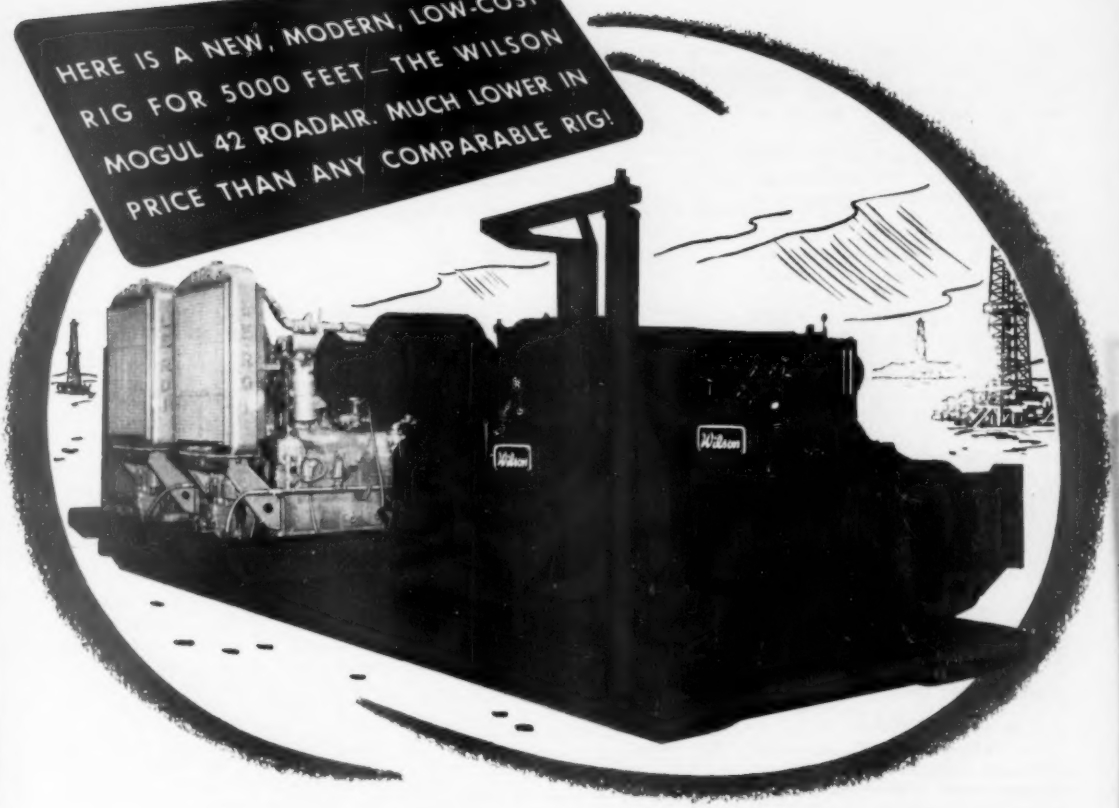

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The Mogul Roadair "42" Rig was designed to meet the need of those customers who want a rig *with compounded engines* of up to 400 H.P. total, to drill wells up to 5000 feet with 4½" pipe, without torque converters, and at the lowest total cost. This rig more completely fills all of these requirements than any rig we know. Of the 400 engine horsepower, 300 can be used on the pump and about 100 on the rotary table, and yet all 400 H.P. will be available when coming out of the hole.

The rig also has the safety and dependability inherent in having two engines, with compound, so that either can be used in the event of failure of the other. The V-belt compound is designed to use the high strength steel cord V-belts, which are run at fairly high speed, to carry relatively large H.P. in a narrow width.

It is equipped with a 118 Air-Tube disc engine clutch in a positively aligned clutch housing, which has proved so successful in other Wilson Roadair and Torcair Rigs.

The drum assembly in this rig is exactly like the regular Mogul Torcair "42" rig, which has two friction clutch drum speeds. But in addition it has a two speed jaw clutch transmission in a heavy plate case. The brake rings are "42" diameter, and brakes are 8" wide, full wrap type and cam and roller operated.

This is a fast, dependable rig, at the lowest possible cost, that will make possible *lower drilling costs than any other rig of comparable size!*

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WICHITA FALLS, TEXAS

ing fluid was water for the first 2,000 ft. Only 40 sacks of Aquagel were used for finishing in the Oil Creek sand. Maximum bore deviation did not exceed 3°.

Crews started up with only 5,000 lb. on bit, with one drill collar in the string. This practice was employed in drilling through the difficult drilling interval logged from 1,500 to 4,800 ft. At 4,800 ft. crews added eight drill collars to the string and increased weight on bit to 25,000 lb. Generally, no difficulty in maintaining straight hole was encountered below 6,400 ft. or the top of the Viola.

The contractor encountered three fishing jobs consuming a total of 11 days on the 1 Pope-Stryon. The trouble was caused by bridges due to hard ledges in the hole which would crack the cone. It was corrected by taking more time in making round trips. In completing these wells, contractor displaced the drilling mud with water and then displaced the water with field crude oil, completing the wells through tubing.

Fleet Drilling Co., of Ada, Okla., drilled a 7,895-ft. dry hole for Ray Ryan at 1 Alexander, C SE NE of 28-1n-9e, ½ mile northwest of present productive field limits.

Fleet Drilling Co.

Fleet Drilling used its Rig 29 to drill from grass roots to 3,376 ft. This rig comprised an N-70 draw works mounted on a 5-ft. substructure equipped with an 87-ft. mast. The draw works and the 7½ by 12-in. pumps are powered by one 145-hp. motor and one 165-hp. gas-butane engine. It was equipped with 3½-in. drill pipe. Three drill collars were employed in cutting hole to a depth of 3,376 ft.

After a depth of 3,376 ft. was reached, crews moved off Rig. 29 and moved in Rig 28. Rig 28 is a Model 64-A draw works on a conventional steel derrick on an 8-ft. substructure. The two 225-hp. gas-butane engines drive the draw works and a 7¼ by 14-in. mud pump. The draw works are equipped with a 40-in. brake. In the cellar is a single 10-in. blowout preventer. This rig is equipped with 4½-in. drill pipe.

At 3,376 ft., crews added nine drill collars to the drilling string to take the well down to the Oil Creek sand objective.

Drilling processes . . . Drilling processes used in 1 Alexander are summarized in an accompanying table. A total of 102 days were required from spudding to completion. Of this amount 55 days were consumed in drilling to 7,600 ft. and 47 days from 7,600 to 7,895 ft. As much as 21 days were used in coring and testing this outpost test; this included eight drill-stem tests run at intervals from 2,126 ft. down to 7,851 ft. However, only one core was cut, from 7,655-60 ft. in the McLish (Simpson) series.

Water supply came from a small lake situated 1¾ miles southeast of the well. Gas piped 3 miles to the lease, and butane comprised the fuel used.

Mud requirements were only 1,250 sacks of gel, 3,500 lb. of soda ash, and 25 bbl. of red mud.

Mora Drilling Co. drilled for Glenwood Oil Co. at the 1 R. M. Lass, C NE SW 33-1n-9e. This was the deepest well drilled in the field and was taken to a total depth of 7,911 ft. where it was abandoned on July 22, 1952. This well is located on the south down-fault side of the East Oconee structure. Considerable difficulty was encountered in keeping straight hole.

As shown from an accompanying table, maximum deviation reached 4° at 5,952 ft.; a heaving shale zone had been logged at 5,653 ft. A total of 151 bits were required in drilling this well. As much as $1,500 worth of mud was required, comprised as follows:

Indian gel, tons	20.75
Barite, tons	8
Quebracho, lb.	400
Caustic soda, lb.	1,500
Soda ash, lb.	500

Mora Drilling used a medium-size rig equipped with a 97-ft. mast. The draw works and 7½ by 16-in. mud pump were motor driven.

This contractor cut surface hole with 13¾-in. bit to a depth of 350 ft., at which the 10¾-in. pipe was set and cemented with 350 sacks. The shoe was drilled with a 9-in. bit and this hole size carried to total depth.

Field Rules

The Oklahoma Corporation Commission on June 26, 1951, ordered the establishment of 40-acre drilling and spacing units for the production of oil and/or oil and gas from the Second McLish common source of supply, the Oil Creek common source of supply, and any other common source of supply found below the Second McLish common source of supply, underlying the following described area: all of Sections 26, 27, 34, and 35; the east half of Section 28; the east half of Section 33-1n-9e.

The commission permitted the location of a well in each drilling and spacing unit in the center of each 40-acre tract with a tolerance of 150 ft. as to such locations in order to avoid surface hazards.

Crude-Oil Outlet

Crude oil produced from East Oconee oil field is moved by pipe-line facilities of Mid-Continent Pipe Line Co., through its 12-mile, 4-in. lateral to the Fitts station on the Mid-Continent system, completed on June 18, 1952.

Current crude-oil allowables established by the Oklahoma Corporation Commission provide for 180 bbl. per day per well for the Oil Creek sand and 75 bbl. per day per well for the McLish sand zone.

The 10 wells include 2 dual completions, described as follows:

Coal Oil & Gas Co. 1 Hughes, C SE NW 34-1n-9e, which produces oil through the tubing from the Oil Creek sand and gas through the annulus from the Oil Creek sand.

Coal Oil & Gas Co. 1 Hughes-Pope, C SE NW, 34-1n-9e, which produces oil through the tubing from the Oil Creek sand and oil through the annulus from the McLish sand.

NEW FIELD DATA — DRILLING AND DEVELOPMENT

Name: East Oconee. **Location:** Coal County, Oklahoma.

Method of exploration: Surface and subsurface geology.

Type of structure: Group of parallel, faulted anticlines lying in major horst paralleling the Belton anticline.

Discovery gas well: North area: J. A. Roberson (formerly Continental Oil Co.) 1 J. W. Daniels, SW NE SW 27-1n-9e, originally completed on June 9, 1949, for an estimated 2,000 M.c.f. of gas in 24 hours through casing perforations from 6,915-50 ft. in the Simpson McLish sand series after acidization with 1,000 gal. at plug-back depth of 7,020 ft., original total depth 7,218 ft. Reworked on October 18, 1950, attempted squeeze job but lost drill pipe in hole and was junked on January 11, 1951.

Discovery gas well: South area: Coal Oil & Gas Co. 1 J. R. Pope, C W/2 SW NE 34-1n-9e, spudded 3-27-50, drilled to total depth of 7,299 ft., and completed on November 21, 1950 for an initial calculated open flow of 27,980 M.c.f. of gas per day (with 13.1 bbl. of distillate per million cubic feet of gas) through casing perforations from 7,173-80 ft. in Second McLish sand topped at 7,165 ft. **Renewal:** deepened to new total depth of 7,500 ft. ran liner in 7-in. pipe set at 7,246 ft. and recompleted as single-hole completion from Oil Creek (Simpson) sand.

Wells:

Flowing oil wells: (Jan. 1, 1953)	12
Deepest well drilled: Glenwood Oil Co. 1 R. M. Laas, C NE SE 33-1n-9e, TD 7,911 ft. in Oil Creek zone topped at 7,905 ft., completed as dry hole July 22, 1952.	

Well spacing:

Oil wells, acres/well	40

Production:

Daily average oil production (Dec. 10, 1952), bbl./day, app.	1,660
Produced gravity of crude oil: Oil Creek, °A.P.I.	35.9-37.0
Allowables: (Corporation Commission of Oklahoma)	
Second McLish sand (approx. 7,100 ft.), bbl./day/well	75
Oil Creek sand (approx. 7,500 ft.), bbl./day/well	180

Market outlet:
Mid-Continent Pipe Line Co. through 12-mile, 4-in. lateral to Fitts station northwest of East Oconee, completed on June 18, 1952.

Principal operators:
Coal Oil & Gas Co., Tulsa, J. A. Roberson, Tulsa.

Petroleum Waxes Dominate Field

By the selection of crude oil and/or tank bottoms and by control of distillation and solvent separation the refiner has been able to produce a multitude of grades of waxes

by Bruce H. Clary*

PETROLEUM waxes are replacing those from other sources for a great many uses. To illustrate this trend, 93 per cent of the 454,000 tons of wax consumed in the United States in 1951 was of petroleum origin. About 91 per cent of the petroleum wax marketed in that year was crystalline (paraffin), the remainder being microcrystalline.

As applications for petroleum waxes have become more diversified, the refiner was turned to chemical processing to develop waxes to meet specific needs. Halogenation has been used to develop fire-resistant waxes, while oxidation has been employed to produce emulsifiable waxes.

Two fundamental types . . . In the refining process one can see the fundamental reason for two types of petroleum wax. Paraffin comes from the dewaxing of distillates — microcrystalline from residuum. The separation of oil from wax can be accomplished by pressing and sweating or by selective solvents which have a high solvency for oil and low one for wax.

Since microcrystalline wax is separated from residuum, its boiling range is much higher, resulting in higher average melting points. Paraffin, having passed through the vapor stage in its separation from crude oil, is a definite fraction having both an initial boiling point and an end point, while microcrystalline wax has only an initial boiling point and no specific end point. It is all the wax in a given crude, less the paraffin which is distilled off.

This accounts for the fact that all refinery paraffin waxes are essentially alike in their general characteristics. Solvents alone do the job of dewaxing residuum. Methylethylketone, propane, ethylene dichloride and sometimes naphtha, are used to dissolve the oil and thus separate microcrystalline wax.

The chief chemical difference between paraffin and microcrystalline wax is found in their molecular structure. While it cannot be stated conclusively that paraffin consists entirely of straight-chain normal hydrocarbons, this is ordinarily considered to be true. Furthermore, the successful processing of paraffin wax of good quality is primarily dependent on the proper preparation of a wax distillate which is a rather narrow fraction of the crude oil.

Wax from tank bottoms . . . At the bottom of an oil well in Texas or Oklahoma, the temperature of the crude oil often exceeds 140° F. When the oil flows or is pumped to the surface, it is collected in large tanks near the oil fields before being transported by pipe lines to the refineries. The slow cooling of the oil in these tanks causes the solidification of the high-melting wax fractions which then settle to the bottom of the tanks.

This precipitation is promoted by the abrupt and drastic atmospheric temperature changes common to the Southwest. This mixture of settlings, which is called tank bottoms, slowly builds up in the tanks and must be removed from time to time as it cannot be easily handled in pipe lines. Obviously, this mixture contains a considerably larger percentage of higher-melting fractions than the crude from which it settled.

The separation of the waxy materials from the rest of the tank bottoms is a troublesome and difficult procedure. It involves not only the physical removal of the tank bottoms from the tanks by pumping, shoveling, and scraping, but also the breaking of the emulsions and subsequent transportation of the dehydrated tank bottoms to the refinery. After the cleaned material arrives at the wax plant, it is subjected to the same general processes for wax removal as crude oil. Large yields of high-melting-point microcrystalline wax results from such handling of tank bottoms.

TABLE 1 — PHYSICAL PROPERTIES OF PETROLEUM WAXES

	Paraffin wax	Microcrystalline wax
Flash point, °F.	400 Min.	500 Min.
Viscosity, S.U.s. at 210° F.	40/50	60/120
Centistokes at 210° F.	4.2/7.3	10.2/25.1
Melting point, °F.	115/155	140/200
Refractive index at 212° F.	1.430/1.433	1.435/1.445
Molecular wt., avg.	350/420	600/800
Range of carbon atoms per molecule	20/30	30/75
Physical aspects	(*)	(†)

*Friable, crystalline. †Low M.P. grades, ductile, plastic. High M.P. grades, tough, brittle.

Waxes by chemical reaction . . . When the physical processes at his disposal become inadequate in producing waxes for specific needs, he has turned with some success to a chemical attack on the problem.

Halogenation and oxidation appear at the moment as the chief methods of chemical attack on these quite resistant waxes.

Oxidation of the high-molecular-weight microcrystalline waxes is employed for the production of emulsifiable waxes.

Current practice in the production of these emulsifiable waxes generally consists of passing a stream of air through an especially prepared microcrystalline wax in the presence of a catalyst. The conditions of temperature, time, and air input are carefully controlled. The process is, of necessity, a batch operation, the cycle being complete when the desired saponification number is reached.

At the time these emulsifiable petroleum waxes appeared on the market in quantity, it was recognized that there were several points at which improvements were indicated, such as color, hardness, odor, and emulsion stability.

The color has been improved until it is approaching an entirely satisfactory state.

Hardness is being improved gradually. It is probable that hardness as indicated by the penetrometer is not important beyond some as yet undetermined point. Stickiness or tack in these waxes is sometimes allied in the user's mind with hardness, although they do not always go hand in hand with it.

Odor is improving somewhat, and should in time be entirely satisfactory.

Stability of emulsions is an extremely important matter and probably a function of the formulation of the emulsion as well as of the wax itself.

*Wax division, Bareco Oil Co. Summary of paper presented at Chemical Specialties Manufacturers Association meeting, New York, December 8, 1952.

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Good Heat-Exchanger Maintenance Pays Off

Quantity of scale is not always best measurement of need for cleaning; production losses can be caused by fouling

by James S. Connors*

ANY gain or loss of heat-transfer rate due to scaling at the heat-transfer surface will have an immediate effect on cooling towers, boiler house, or direct-fired preheater. This in turn will lead to a general decrease in plant production.

Quantity of scale is not always the best measurement of the need for heat-exchange-equipment cleaning. Rate of heat transfer through a thick layer of dense, hard scale may be comparatively high, while the rate through a thin layer of porous scale or slime may be quite low.

For these reasons, plant-performance data should be carefully analyzed to determine the proper maintenance schedule for heat-transfer equipment.

Scale deposits . . . There is a tendency to regard the scale formed on the water side of water-cooled heat-transfer equipment as the only source of interference with heat transfer. The problem of such deposits has been so great that it has overshadowed the effect that loss of heat-transfer efficiency in other equipment has had on the over-all problem of maintaining the oil being circulated over the absorbers at the lowest possible temperature to secure the most efficient recovery of gasoline and equipment use.

It is impossible to evaluate with any great degree of accuracy the effect of thickness of scale deposits on the heat-transfer rate. A thin deposit of a loose porous scale or slime may be far more detrimental to the heat-transfer rate than a much thicker deposit of a hard dense scale. In one specific instance, deposition of a thin layer of loose uncemented phosphate organic sludge, which could easily be removed by water washing, in the water jackets of engines resulted in the cracking of several engine heads in a little over a month's time.

Prior to the change in water treatment, the formation of a hard dense scale consisting principally of calcium carbonate and calcium sulfate, approximately $\frac{1}{32}$ to $\frac{1}{16}$ in. thick had not caused appreciable damage to the engine.

Types of scale deposits . . . Nelson* classifies scale deposits under three headings according to their detrimental effect on heat transfer as follows:

1. Hard deposits—formed by water scale, corrosion products, rust, hard coke, etc.
2. Porous deposits—formed by mud and dirt deposited from water or oil, coke and carbon, asphalts, tars, etc.
3. Loose deposits—formed by silt and mud, soot, powdered coke, vegetable matter, polymers, slimes, etc.

The third classification is the most detrimental. Naturally there can be no firm distinction among these three classes of deposits as the character of each deposit will change with age, and the temperature to which they are subjected.

Fouling factors . . . The process designer must always adjust his calculations for heat-transfer rates by inserting a resistance factor known as the fouling factor. In many cases this fouling factor is the predominant resistance to heat transfer. For example, a steam preheater heating 675,000 gal. per day of absorption oil and absorbed gasoline from 310° to 365° F. would have a theoretical heat-transfer rate of 358 B.t.u. per hour per sq. ft. per °F, if the metal surface could be kept polished to a mirror smoothness and only true film factors considered.

This same preheater when the film-transfer rates for commercially clean equipment are applied would have a calculated heat-transfer rate of 177 B.t.u. per hour per sq. ft. per °F. If the fouling factor were doubled to allow for some deposition of organic matter on the oil side and for some corrosion on the steam side the calculated heat transfer rate would decrease to 128 B.t.u. per hour per sq. ft. °F. This latter figure is used in normal plant design.

The same type of calculation is followed in all heat-exchanger design. Fig. 1 shows the effect on the calculated heat-transfer rate when the fouling factor is increased from 2 to 4. With the development of the present practice of using direct-fired furnaces for heating rich absorption oil, the rate of fouling of oil heat-exchange equipment has increased due to the skin cracking, and consequent carbon formation, which takes place in the furnace.

It is impractical to provide initial fouling factors large enough so that the heat-exchange equipment will never require cleaning, and periodic cleaning is assumed in the selection of the fouling factor. However, there are many times where maintenance on oil-to-oil heat-exchange equipment is delayed intentionally until a convenient time can be found or until such time as emergency repairs would have to be made. This same statement can be applied to the maintenance of all other heat-exchange equipment.

Effect of delayed maintenance . . . Any gain or loss of heat-transfer rate on the oil exchangers will have an immediate effect on the cooling towers, boiler house or direct-fired preheater, and plant production. It is a rather broad statement to merely say that all equipment is affected so let us try to evaluate such effects.

In order to make an evaluation, the following assumptions are made:

1. The temperature of the rich oil

*Phillips Petroleum Co., Bartlesville, Okla. Presented at regional N.G.A.A. meeting, Amarillo, Tex., November 21.

*Petroleum Refinery Engineering, W. L. Nelson.

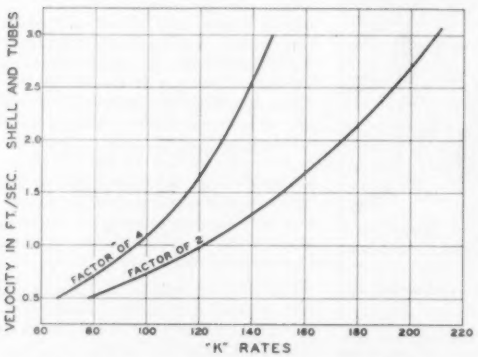

Fig. 1—Effect of fouling factor on heat-transfer rate.

leaving the heat exchangers has dropped approximately 10° F. due to fouling of the tubes on a 500,000-gal. per day unit. In order to try and recover this 10° F. it is general practice to allow the preheater to pick up the load. If the preheater is operating on steam, it will require an additional 22,000 lb. per day of steam or if direct fired it will require the burning of an additional 33,000 cu. ft. per day of gas. For a 1,000,000-gal. per day plant these quantities would be doubled.

2. If the preheater can only pick up half of the load or if the rich oil to the still is 5° F. lower than normal, this will result in a loss of approximately 2 per cent of the C_5+ fraction carried in the rich oil, if additional stripping steam is not added. An additional loss will also be caused at the absorber by the fact that the oil has not been completely stripped. This latter effect is small on the C_5+ fraction loss to residue with low-pressure absorption as compared to high-pressure absorption since over-all absorption on the low-pressure units is poorer to begin with. This phenomenon will result in a ½ to 3 per cent loss depending on the amount of pentane left in the oil, the operating pressure, and the relative oil rate. The sum of the two effects can result in the loss of several hundred gallons of C_5+ per day.

3. Returning to the lean-oil side of a partially fouled exchanger, if the oil leaving the exchanger is 10° F. higher than normal, the cooling tower must pick up the load which amounts to approximately 17,400,000 B.t.u. per day. This affects the operation of the tower in that not as much cooling can be applied to other streams. This in turn can affect the over-all recovery by as much as 5 per cent. However, if we assume that the tower cannot pick up the load and that the oil to the absorbers is 10° F. higher than normal, light-end recovery will be materially reduced. This will make a difference of from 5-15 per cent in the recovery of propane or butane, depending on the actual temperature and operating pressure of the absorbers. Allowing for variation in volume and richness of the gas, the loss of the L.P.G. fractions can vary from several hundred to several thousand gallons per day.

If 100 gal. per day of C_5+ is lost, this amounts to $1,825 per year at $.05 per gallon. If 1,000 gal. of C_3 and C_4 per day is lost, this amounts to about $11,000 per year. These losses can mount rapidly, yet many times being short a "few" gallons of production daily is merely taken for granted.

Other heat exchangers . . . These principles can be applied to all other types of heat-exchanger equipment. A large amount of money is spent on water treatment to minimize the formation of scale in water-cooled equipment. Fouling factors are provided in designs to take care of normal deposition of scale and corrosion products. However, in spite of all efforts, heat-exchange equipment must be periodically cleaned or the benefits of good design may be lost.

In the case where fractionator overhead condensers and coolers are fouled, the reflux temperature will increase and the purity of the overhead and kettle product will either decline or the reflux ratios will have to be increased. In this case, fouling will result in either the loss of column capacity or a decline in product quality with possible failure of the product to meet specifications.

Similarly, fouling of column kettle elements has interferred with heat transfer to such an extent that column pressures have had to be reduced in order to maintain a sufficiently high kettle temperature to allow for complete separation of the lighter components. This reduced the column capacity.

In all of these cases, normal fouling factors have been inserted in the original equipment design calculations. The selection of fouling factors used depends on the designer's judgment and experience, especially since the fouling factor is often a major resistance to heat transfer. The better operation and maintenance the designer can expect, the lower the fouling factor that he can use with correspondingly lower initial investment cost.

Closed condensate systems . . . One question which is often asked is, "Why not make more use of closed condensate systems for condensers and other high-temperature cooling service?" This is a difficult question to answer. As in each individual case, the benefits of such a system must be balanced against the increased cost of installation. For example, the design "K" rate on gas treater overhead condensers has been calculated to be 150 B.t.u. per hour per sq. ft. per °F.

It has been suggested that this be reduced to 100 in order to extend the periods between cleanout. A condenser having a design heat load of 10,000,000 B.t.u. per hour will require approximately 1,350 sq. ft. of exchange surface and the installed cost will be approximately $27,000. If the proposed lower "K" rate due to an increased fouling factor is used, the surface required would be approximately 2,000 sq. ft. and the installed cost would be approximately $40,000. This $13,000 difference will compensate for a considerable expenditure in maintenance.

If a closed condensate system were installed, the actual condenser surface could be reduced to approximately 1,000 sq. ft. and the installed cost would be approximately $20,000. To this $20,000 must be added the cost of coils in the tower to provide for cooling the condensate and the cost of a surge tank and an additional water pump and drive. The estimated cost for these three items is approximately $51,200, making the total cost of the project $71,200. Under these conditions, the value of decreased maintenance must be worth approximately $44,200 if normal "K" rates are used and $31,200 if additional fouling factors are provided on presently designed equipment. For such expenditures, the plant can afford to spend considerably more money on maintenance of the conventional condensers.

In spite of the poor payout in the above example, there are many instances where such closed condensate installations will pay out. However, the payout must be based on other considerations than maintenance only. These considerations include (1) the effect on plant production during periods of cleaning and (2) how critical the performance factors of the equipment in service are. One example of the latter consideration would be on surface condensers operating to condense steam under high vacuum to promote high turbine efficiency.

Quantity of scale is not always the best measurement of the need for heat-exchange equipment cleaning; losses of production can be caused by heat-exchanger fouling.

"When you get through knocking 'em dead with those after-dinner banquet jokes for tonight—here's a mess of letters to sign."

How to Lengthen Life Of Solid Desiccants

. . . Remove contaminants

. . . Avoid mechanical damage

. . . Proper reactivation conditions

by Boyd F. Koepke* and V. M. Stowe†

THE effective service life of solid desiccants in drying natural gas, L.P.G., and petroleum products may be lengthened materially through (1) removal of contaminants, (2) avoidance of mechanical damage to desiccants, and (3) use of suitable conditions of reactivation.

Solid desiccants such as activated alumina have been used commercially for drying furnace atmosphere for heat-treating steel for 21 years. Other non-oil-industry applications include use in wind tunnels for aircraft research, in dehydrators for decommissioned naval vessels, in liquid-air plants, and in drying many other commercial gases, such as hydrogen sulfide, nitrogen, carbon dioxide, hydrogen, oxygen, and others.

Nearly all of these other users are obtaining periods of service life longer than has been obtained in drying high-pressure natural gas. What can be done then, to increase the effective life of solid desiccants in drying natural gas, L.P.G., and petroleum products? An analysis of process conditions and solid desiccant behavior under these conditions points up several methods for improving service life.

Solid desiccants are powerful and rugged and require little attention. Given good care, the service life of solid desiccants in drying hydrocarbons may approach the fine records attained by these materials in other fields of application.

Removal of Contaminants

In drying natural gas, contaminants offer a serious problem for all solid desiccants. Among these contaminants they may be distillate, oils, brine, and dust. Heavy fractions may be adsorbed and not removed during reactivation. An accumulation then builds up, taking up space on the desiccant which should be used for adsorbing water.

On repeated reactivation the material chars and polymerizes. No solvent is known that will remove this material. Tests have been made by washing with naphtha, alcohols, ketones, aromatics, and other organic solvents, but none of them improve used desiccants of either silica or alumina type to any practical extent. However, dust, fines or any water-soluble impurities such as salt can be hosed out without damage in the case of activated alumina, since it is completely resistant to the action of liquid water.

Resistance to free water. . . . The ability of activated alumina to withstand liquid water is not limited to one treatment. It can be reactivated and immersed again and again with no shattering. Such repetition will, however, shatter even the more resistant types of some other desiccants. This resistance is of practical importance because slugs of water are sometimes accidentally carried along with the gas stream and find their way into the desiccant beds. Also, during reactivation, liquid water may condense in the cool end of the desiccant bed.

The best way to handle the problem of contaminants is to remove the contaminating material. This can often be done to a very helpful extent by using a precontactor, such as the one described by Lane and Thompson *(The Oil and Gas Journal, May 5, 1952, page 174)*.

Case history cited . . . Operating data have been obtained on a small precontactor or extractor which was used to remove oil from compressed air. The extractor was 7.5 ft. deep, 8 in. in diameter, and contained 105 lb. of activated alumina. This operated continuously at 467 cu. ft. per hour for 2 years, a total of 8,180 M.c.f. At the end of this time, separate layers of the desiccant were sampled, and the oil content was determined. The inlet layer contained 12 per cent oil, the middle layer 1 per cent, and the effluent end 0.34 per cent oil.

Desiccants which become spent as to adsorption of water may be set aside for use in such a precontactor, since the capacity for further adsorption of oils will still be moderately high.

Cooling action important . . . Cooling action by means of shell-and-tube condensing units (using water or cold oil as the coolant), accomplishes three things: (1) coalesces the absorption and compressor oils from the vapor phase, (2) removes much of the oil, and (3) reduces water content of the gas.

Removal of much of the oil decreases fouling of the desiccant. Decreasing the water content of the gas reduces the load on the desiccant. Cooling of the gas increases the water adsorptive capacity of the desiccant.

Caustic carryover . . . In drying L.P.G., caustic and wash water towers sometimes precede the dehydrators. The carryover of caustic onto any commonly used desiccant will seriously impair its capacity. This should be avoided by careful operation. Mist extractors may be used to remove the caustic spray.

Sulfur is a contaminant which might prove to be troublesome in drying gas in the field or upon removal from underground storage. Activated alumina shows a service life of as much as 4 or 5 years in drying natural gas with 400 grains of hydrogen sulfide per 100 cu. ft. However, in cases where traces of oxygen are present in the gas along with some hydrogen sulfide, sulfur is deposited rather rapidly, which will foul any type of solid desiccant.

In handling any natural gas including underground storage operations, it is important to keep it free of oxygen so that it can be subsequently dehydrated without danger of deposition of sulfur. If a portion of the gas is to be burned to adjust heat content, that operation should be done after final dehydration of the main flow of gas to avoid deposition of sulfur from reaction of hydrogen sulfide with oxygen residues resulting from the burning operation.

Avoid Mechanical Damage

Sometimes gas throughput becomes excessive when desiccant beds are operated above rated capacity. In such cases, the possibility of establishing turbulence conditions inside the dehydrator should be considered. While a dehydrator may be designed suitably

*Chemical Products Division, Aluminum Co. of America, Kansas City, Mo., and †Aluminum Research Laboratories, East St. Louis, Ill.

for the rated flow, increased flow may blow a deep crater in the top of a bed, and pulverize the desiccant.

Sometimes a baffle plate may be introduced to avoid this difficulty. If the flow is upward, the entire bed may be lifted and abraded. This can be avoided in some cases by completely filling the top space with tabular alumina balls.

Dehydrators should be so designed as to minimize mechanical vibration and pulsation of flow, to prevent abrasion of the desiccant by agitation, especially when compressors are used.

When pressure is released on any high-pressure system, it should be done at a point in such a manner that the gas will pass downward through the bed, and slowly enough so that the bed will not be disturbed.

Finally, it is possible to have a screen or support grate fail, and to discharge the desiccant miles downstream in the pipe line. This can be avoided by use of tabular alumina balls of properly graded sizes in layers, with only a small rugged grate supporting the largest balls around the exit opening of the dehydrating vessel.

Proper Reactivation Important

Reactivation should be carried on until the entire desiccant bed reaches the minimum temperature recommended by the manufacturers of the desiccant. In the case of activated alumina, this is 350° F. If the temperature is too low, heavy fractions and even water begin to linger, which reduces the adsorptive capacity of the desiccant.

Reactivation of desiccants promptly after use is considered good operating practice. Especially before any standby period, the desiccant should be reactivated and valved off. This will eliminate some of the heavy fractions, which might otherwise polymerize, and offset any slow detrimental action of adsorbed water.

In reactivation, it is usually best to have the gas flow direction opposite to the direction of dehydration flow. Then water and heavy fractions can be removed from the inlet end without having to be swept all the way through the bed.

Eliminate liquid trapping . . . Reactivation conditions should be adjusted so that slugs of liquid distillate and water are not trapped in the desiccant bed. It is obvious that this condition, with gas bubbling up through the liquid, will erode the desiccant seriously; the shattered fragments in some cases will be accumulated in drifts which cause channeling in the bed.

Sometimes hard cakes of pulverized desiccant form from this cause. This condition will be avoided by any means for reducing the amount of liquids condensed in the bed, such as using enough reactivation gas to carry the material as vapor, reactivating while the bed is still warm from adsorption, or bringing the temperature up slowly at first. In some cases, where much distillate is present, it may be necessary to reactivate with a downward flow of gas so that any liquids condensing will be swept out promptly.

Reactivation by live steam is harmful to all solid desiccants. Published information *(The Oil and Gas Journal, November 23, 1946, page 67)* indicates that activated alumina used for dehydration in combating internal corrosion in products pipe lines has been successfully reactivated over the course of many years by live steam superheated to 450° F. and the use of vacuum. Probably the reason that its use was successful in this instance was that the liquid hydrocarbons protected the desiccant from the action of the live steam until safe high temperatures were reached. This procedure is not generally recommended, however, because saturated live steam has been shown to have a deleterious action on all solid desiccants now in common use in this field.

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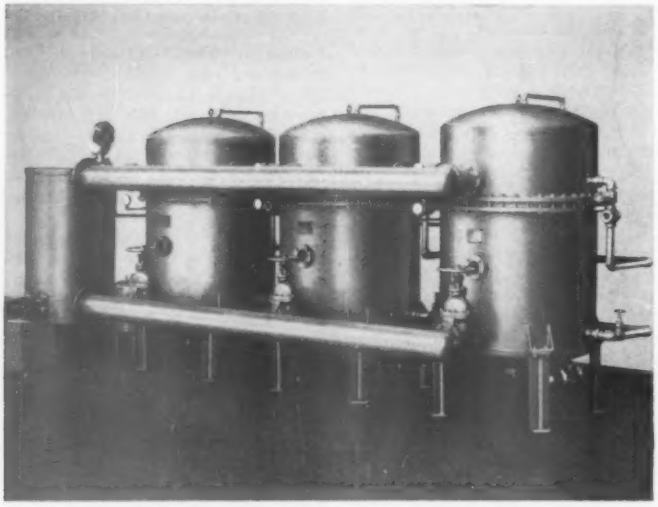

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First-Class Prospects in Permian Basin Are Getting Harder to Find . .

. . . but it should continue as a leading oil province

by H. L. Swords*

THE Permian basin is generally considered to be the marine facies of the Permian and the Permian basin of West Texas and New Mexico is usually called the South Permian basin. It extends from Mitchell County on the east to El Paso on the west and from just north of the Matador arch on the north to the Rio Grande River on the south.

At the present time there are some 45,000 producing wells in the area with the production being approximately 1,300,000 bbl. daily. This is greater than the combined production of Louisiana and Oklahoma. For the past 5 years it has been one of the most active areas in the world, both in drilling and in exploration.

Geophysical Activity

The number of seismic crews in the United States has tripled during the past 10 years, while during the same period seismic activity in the Permian basin has increased five times. Of the more than 600 seismic crews in the country in November 1952, 120 are operating in West Texas and southeastern New Mexico—80 being in West Texas and 40 in southeastern New Mexico. This does represent a loss, however, since the peak of 135 crews in May 1952. There are 12 gravity crews operating, which is double the number in operation during 1951.

University lands . . . Beginning about the middle of October up to the early part of December there is a considerable amount of shifting of seismic crews due to several situations peculiar to West Texas. Twice a year the University of Texas conducts a land sale at Austin. This ordinarily occurs in June and December. The acreage situation in West Texas and southeastern New Mexico is extremely tight. The University Lands represent a very large part of the unleased acreage in the area. These lands have an added advantage of being submitted as drilling blocks, usually four sections. The land offered for lease is put up at the request of one or more companies after shooting has indicated a drillable feature. Copies of final seismic reports are furnished the university, at its request, so the University is well informed as to the possibilities of their acreage.

Some 6 weeks or 2 months prior to the sale, the university publishes an announcement listing all land to be leased and urges that all interested parties investigate the tracts. At this time a number of companies which have either no shooting or insufficient shooting in the areas of interest, send in their crews to detail the tracts to be leased.

As a result of the land sale in December, Andrews County led West Texas in seismic activity in November with some 12 or 14 crews working in a small portion of the northeastern part of the county. This amount of exploratory effort results in rather spirited bidding, and drilling blocks with bonuses of more than $1,000,000 are no longer uncommon.

Locations of crews . . . The reef country of Kent, Scurry, Borden, and Howard counties has definitely passed its peak and only one crew is operating in the area; however, there are six crews working in another reef area, which runs through Tom Green, Schleicher, and Sutton counties.

In addition to the 12 or 14 crews in northeastern Andrews County, there are another 20 crews working in the Midland basin. Still another 20 crews are operating on the Central Basin platform with the remainder in the Delaware basin and the Black Shale basin.

The Plainview basin has only two crews which is quite a drop from previous years. This area has been very disappointing. Although the section appears favorable, no major oil company has reported shows although quite a few wells have been drilled on supposedly good seismic structures.

Around the middle of December in the southern part of the Midland basin and on the Edwards plateau, which represents an area of excellent possibilities since the advent of pattern shooting, a number of crews will move north due to the lambing season.

A good part of the increased geophysical activity in the Permian basin is due to the high percentage of seismic success in southeastern New Mexico, particularly northern Lea County. Since the discovery of Crossroads field in 1948 almost half of the pre-Permian wildcats in northern Lea County have resulted in discoveries. Last year there were 30 seismic crews operating in southeastern New Mexico as compared with 40 today. The Delaware basin has 12 of these crews while most of the others are in Lea County.

Exploratory Drilling

Drilling activity in the West Texas-southeastern New Mexico area has kept pace with, if not exceeded, geophysical activity. Prior to the steel strike, drilling was some 15 per cent higher than last year with more than 700 rigs in operation. Current drilling is just slightly higher than 1951 and 1952's total will very well be less than in 1951, due primarily to the steel shortage and decline of activity in the Spraberry trend.

During the first 8 months of 1952 there have been 607 exploratory wells drilled in West Texas of which 118 have been completed as wildcat discoveries and another 22 resulted in new pools. Out of the 126 exploratory wells in southeastern New Mexico, 26 wildcats were successful and in addition there were 12 extension and 9 new pools.

Deep wells . . . Probably the most significant development in West Texas during 1952 was the success of wildcats in the northern part of the Midland basin, from both the Devonian and Ellenburger formations. Magnolia Petroleum Co., The Texas Co., Phillips Petroleum Co., and Anderson-Prichard Oil Corp. have all made what appear to be good discoveries. This is the area of the million-dollar drilling blocks mentioned previously. Until this year the Devonian had been rather disappointing in the Midland basin, while commercial Ellenburger production was limited to the southern part.

The reef area is somewhat on the decline although discoveries are still being made. General Crude Oil Co.'s discovery in Fisher County early in 1952 has proved to be of major im-

*Union Oil Co. of California, Midland, Tex. Paper presented at the sixth annual midwestern meeting of the Society of Exploration Geophysicists, November 13-14, 1952, Fort Worth.

portance. The most recent reef discovery was the Fullerton Oil Co. 1 Zorns in Terry County, northeast of Wellman field.

The Central Basin platform is still contributing its share of discoveries although the fields being found today do not have the areal extent of the older fields. One of the most publicized discoveries of the year was the Grisham 1 Grisham, a gas well in Culberson County. Subsequent drilling has been somewhat disappointing. Phillips 1 Glenna in Pecos County, another gas discovery, may be the deepest gas well in the world. Top of the pay is at 13,700 ft. and total depth is 14,522 ft.

Shallow wells . . . As a matter of interest, there were two very shallow discoveries made on the east side this year, the Rasnick 2 Ellwood estate well in Mitchell County which was completed for 61 bbl. a day at a total depth of 133 ft., and the Stanolind Oil & Gas Co. 1 Johnson in Tom Green County, completed for 22 bbl. a day at a total depth of 53 ft. Both of these discoveries may be definitely classified as seismic successes as oil was found in shot holes while surveys of the areas were being run. Undoubtedly the most unusual completion of the year was the McCormick 1 Ratliff in Sunflower Sand field in Mitchell County, which pumped 16½ bbl. of oil in 10 hours with total depth at 2¾ ft., top of pay picked at 2 ft. Completion was natural and no casing was run.

Delaware basin . . . Lea County, New Mexico, is the most active area in the Permian basin at present with approximately 140 rigs in operation. This is primarily due to the high percentage of success of the pre-Permian wildcats in the northern part of the county. Two of the most important discoveries were The Texas Co. 1 Moore and the Amerada Petroleum Corp. 1 Weems. The Amerada well, though one location in Texas, is still part of the northern Lea County basin. The Sun Oil Co. 1 Harper-Federal has attracted considerable attention as it is the first Delaware basin well to get interesting shows below the Delaware sand. This well is bottomed at 11,691 ft. in the Bone Springs formation, where a completion attempt is being made.

The possibilities of deep production in the Delaware basin are being rather well tested for the first time. Richardson & Bass are drilling three deep tests in Eddy County after rather extensive seismic operations. These wells should go a long way toward evaluating the pre-Permian possibilities of the area. One of the three active wells is now drilling near 10,000 ft. and is reported to be still in Permian. Other deep tests by Shell Oil Co. and Gulf Oil Corp., and Stanolind along the rim of the Delaware basin are also being drilled. First indications of Devonian oil in the area were found in the Buffalo-Baish well in Maljamar field early in 1952.

No large Permian discoveries were found in either West Texas or southeastern New Mexico during 1952 although there were quite a few completed and in the aggregate they will contribute considerably in the way of reserves.

A large majority, or perhaps all of the pre-Permian wildcat discoveries in 1952 have been located with the seismograph. Since present-day deep wildcats cost between $200,000 and $500,000, it is just good policy that all available information be used in locating deep tests. As an example of how long some wells take, Phillips 1 Glenna, spudded February 15, 1951, was completed August 15, 1952, a total of 18 months between spudding date and completion.

Although first-class prospects are getting much more difficult to find in the Permian basin, exploratory statistics indicate that the high discovery ratio of recent years is still being maintained. Along with improved techniques and general high activity, the Permian basin should continue to be one of the leading oil provinces of the country.

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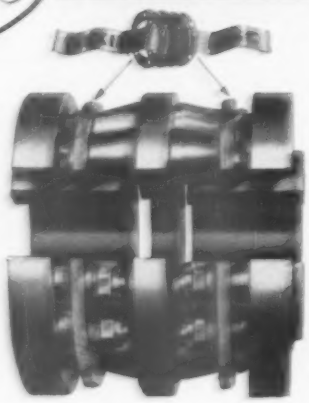

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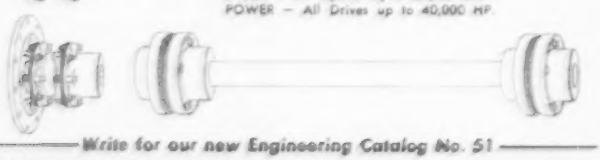

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THOMAS FLEXIBLE COUPLING COMPANY
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MEXICAN REPORT:

New Discoveries Point Up Significance of Ezequiel Ordóñez

Wells completed to date indicate strongly that structure has characteristics identical to those of the Golden Lane

by Armando Morán*

THE most important recent discovery made by Petróleos Mexicanos, the "Ezequiel Ordóñez" structure, lies to the eastward and 21 km. (12 miles) on a beeline from Poza Rica's main installations.

For a good many years several seismic parties had been exploring the area corresponding to an structural trend which it was hoped would be the continuation of the Golden Lane inasmuch as drillings made on two highs of this trend, named Acontitla and Horcón, had rendered valuable stratigraphic information to justify this belief.

The data furnished by these drillings led to further seismic exploration work towards the southeast that in turn disclosed the existence of several structural highs at considerable distance from the Golden Lane. The 1 Miguel Alemán well (originally known as 1 Arroyo Grande) was located and drilled on one of these highs and the El Abra limestone formation found in it exhibited characteristics very similar to those, already well known, of the Golden Lane fields even though it was invaded by salt water and showed slight impregnations of asphalt.

Seismic activity . . . By means of a log of velocity of propagation of seismic waves run in this well it was possible to make a reinterpretation of the seismic-log graphs previously obtained and as a result thereof the 2 Arroyo Grande well was located and drilled. In this well the top of El Abra limestone was met with at a depth structurally higher than in the 1 Miguel Alemán, but it was also invaded by salt water.

With all of the geologic information obtained and available from the wells drilled up to then, seismic exploratory work was intensified throughout the area and the 1 Poza Verde well was located on the same structural trend where previous drillings had been made. This well, drilled in early 1952, showed that the El Abra formation was likewise invaded by salt water with fair traces of hydrocarbons.

The fact that throughout this series of wells the producing limestone was always found to have identical characteristics and its top rose progressively as further drillings were made on this trend on a northwesterly direction, was the deciding factor in the location of the 2 Poza Verde well, drilled about the middle of 1952, in which the presence of hydrocarbons was detected by continuous logging as soon as the El Abra limestone was penetrated.

Its original name was changed to Ezequiel Ordóñez to honor the memory of a Mexican geologist who pioneered in oil exploratory work in Mexico, and his name was also extended to the structure discovered by the drilling of this well. The now 1 Ezequiel Ordóñez well turned out to be a gas producer and the tests run upon its completion showed a daily volume of 12,800,000 cu. ft. through a 20-mm. (0.79-in.) choke.

Drilling program . . . Considering that this well had been drilled on the highest part of the structure and believing that the latter might yield oil if hit at a more favorable location, the 2 Ezequiel Ordóñez well was then located 500 m. (1,650 ft.) away from No. 1 on a N 59° W course. Actual drilling reached the top of the limestone 31 m. (104 ft.) lower than in No. 1 and when running a formation test in open hole a gas flow was obtained, with bottom-hole pressures similar to those of its predecessor, all of which strengthened the belief that this No. 2 well was still in the gas cap.

After cementing 6⅝-in. casing, it was decided to deepen the hole and the oil-impregnated limestone was reached at 1,575 m. (5,180 ft.); a 4½-in. liner was then cemented and jet-perforated with thirty-six ½-in. perforations in the interval 1,594.5-1,588.5 m.; after setting 2⅞-in. tubing the well was treated with 5,700 l. (1,500 gal.) of acid and it subsequently started flowing with a measured production of 6,200 bbl. of crude oil per day through a 20-mm. choke.

EZEQUIEL ORDONEZ structure may be a continuation of Mexico's Golden Lane. Stratigraphic information obtained from drillings made in the area of this new discovery tend to justify this belief.

Production data . . . A button-hole-pressure survey was then made which showed that pressures were 166.6 and 164.8 kg. per sq. cm. (2,730 and 2,345 psi.) for shut-in and flowing well respectively and on the surface 41.5 and 40 kg. per sq. cm. (59 and 57 psi.) through the tubing and casing respectively, under flowing conditions; thus the productivity index is equal to 2,300 barrels per day per kg. per sq. cm. (14.22 psi.). The time period to determine the shut-in bottom-hole pressure was 3 minutes and the gas-oil ratio measured under the flowing conditions above described was 50, which tends to confirm the belief that the dynamic conditions prevailing in the structure are identical to those that existed in the Golden Lane fields.

Other drilling . . . In order to determine the accumulation conditions on the other flank of the structure, i. e. southwest, the 3 Ezequiel Ordóñez well was drilled 340 m. (1,120 ft.) away on a S 500 W course from No. 1 In this well the top of El Abra limestone was found to be 14 m. (46 ft.) lower than in No. 1, which seems to mean that the structure tends to level

*Petroleum Engineer, Petróleos Mexicanos.

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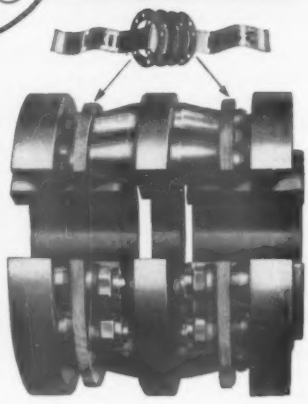

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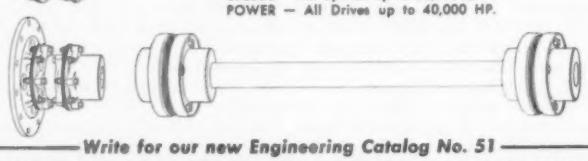

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The fact that throughout this series of wells the producing limestone was always found to have identical characteristics and its top rose progressively as further drillings were made on this trend on a northwesterly direction, was the deciding factor in the location of the 2 Poza Verde well, drilled about the middle of 1952, in which the presence of hydrocarbons was detected by continuous logging as soon as the El Abra limestone was penetrated.

Its original name was changed to Ezequiel Ordóñez to honor the memory of a Mexican geologist who pioneered in oil exploratory work in Mexico, and his name was also extended to the structure discovered by the drilling of this well. The now 1 Ezequiel Ordóñez well turned out to be a gas producer and the tests run upon its completion showed a daily volume of 12,800,000 cu. ft. through a 20-mm. (0.79-in.) choke.

Drilling program . . . Considering that this well had been drilled on the highest part of the structure and believing that the latter might yield oil if hit at a more favorable location, the 2 Ezequiel Ordóñez well was then located 500 m. (1,650 ft.) away from No. 1 on a N 59° W course. Actual drilling reached the top of the limestone 31 m. (104 ft.) lower than in No. 1 and when running a formation test in open hole a gas flow was obtained, with bottom-hole pressures similar to those of its predecessor, all of which strengthened the belief that this No. 2 well was still in the gas cap.

After cementing 6⅝-in. casing, it was decided to deepen the hole and the oil-impregnated limestone was reached at 1,575 m. (5,180 ft.); a 4½-in. liner was then cemented and jet-perforated with thirty-six ½-in. perforations in the interval 1,594.5-1,588.5 m.; after setting 2⅞-in. tubing the well was treated with 5,700 l. (1,500 gal.) of acid and it subsequently started flowing with a measured production of 6,200 bbl. of crude oil per day through a 20-mm. choke.

EZEQUIEL ORDONEZ structure may be a continuation of Mexico's Golden Lane. Stratigraphic information obtained from drillings made in the area of this new discovery tend to justify this belief.

Production data . . . A button-hole-pressure survey was then made which showed that pressures were 166.6 and 164.8 kg. per sq. cm. (2,730 and 2,345 psi.) for shut-in and flowing well respectively and on the surface 41.5 and 40 kg. per sq. cm. (59 and 57 psi.) through the tubing and casing respectively, under flowing conditions; thus the productivity index is equal to 2,300 barrels per day per kg. per sq. cm. (14.22 psi.). The time period to determine the shut-in bottom-hole pressure was 3 minutes and the gas-oil ratio measured under the flowing conditions above described was 50, which tends to confirm the belief that the dynamic conditions prevailing in the structure are identical to those that existed in the Golden Lane fields.

Other drilling . . . In order to determine the accumulation conditions on the other flank of the structure, i. e. southwest, the 3 Ezequiel Ordóñez well was drilled 340 m. (1,120 ft.) away on a S 500 W course from No. 1 In this well the top of El Abra limestone was found to be 14 m. (46 ft.) lower than in No. 1, which seems to mean that the structure tends to level

*Petroleum Engineer, Petróleos Mexicanos.

down on this flank and that, therefore, a greater development of the producing limestone may be expected.

In an attempt to determine the water-oil contact in this well, drilling was continued down to a depth of 1,560 m. (5,150 ft.) which, subsea level, is equivalent to that reached in the Poza Verde that was invaded by salt water but which, at such depth, did not appear in this No. 3 well due to variations in the permeability of the formation. This fortunate circumstance makes of the No. 3 well a producer of the same capacity as the No. 2.

Continuing with the plan of immediate development of this new field there have been drilled and completed as producers, three more wells numbered 4, 6, and 7.

The 4 Ezequiel Ordóñez well was drilled 1,000 m. (3,290 ft.) away on a N 86° 30 ft. E course from No. 1, on the northeastern flank of the structure and in such a location as would allow the determination of the water-oil contact for which purpose it went down to a depth of 1,515 m. (5,000 ft.) subsea level where the first salt-water indications were met with, thus establishing the water-oil contact at that stated level and the top of the El Abra limestone determined at 1,476 m. (4,850 ft.), also below sea level.

After cementing 6⅝-in. casing at 1,572 m. (5,180 ft.), it was jet-perforated in the interval 1,562-1,556 m. (1,489-1,483 subsea level) and the well was completed with a measured production of 2,284 bbl. of crude oil per day, through a 20-mm. choke.

In the Ezequiel Ordóñez well, whose drilling, from spudding to final completion, took but 26 days to reach a total depth of 1,575 m. (5,180 ft., the top of El Abra limestone was encountered at 1,410 m. 4,640 ft.) subsea level, which is but 9 m. higher than in well No. 2. However, since the water-oil contact had already been established, this knowledge allowed jet perforation of the 6⅝-in. casing at a lower level than in No. 2, that is, in this No. 6 well the interval 1,495-1,485 m. was put into production with a measured volume of 5,720 bbl. of clean crude oil per day through a 20-mm. (0.79-in.) choke. This well is located on a S 72° 30′ E course and 495 m. (1,630 ft.) away from the 1 Ezequiel Ordóñez.

On November 17 well No. 7 of this field was completed as an oil produer, located 525 m. (1,630 ft.) away from No. 1 on a N 10° W course. The top of the producing limestone was found at 1,409 m. (4,640 ft.) subsea level and the hole drilled to a total depth of 1,619 m. (5,330 ft.) (1,505 m. subsea level) in a 22-day period. This well produces from the 1,609-1,599 (1,495-1,485 subsea level) meter interval, which is the same as in the No. 6 well inasmuch as the top of the producing formation was reached at practically identical levels in both. Consequently, the daily production of this No. 7 well is similar to that from No. 6.

Golden Lane characteristics . . . Judging from the performance of the wells completed to date in this recently discovered field, it is practically a certainty that the structure enjoys characteristics identical to those of the fabulously rich Golden Lane.

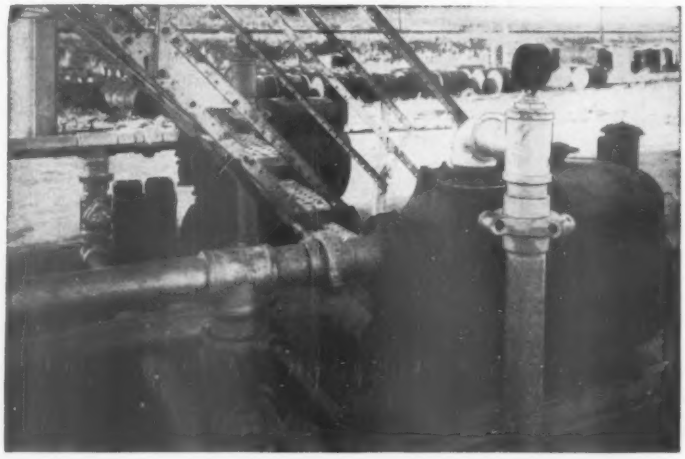
In the Horcón structure, located on the same trend as the Ezequiel Ordóñez and at a straight-line distance of 80 km. (48 miles) from the latter, there was recently drilled and completed the 103 Horcón well at a higher level and with a production of 430 bbl. of crude oil per day. It may, therefore, be expected that all structures lying along the same trend on which the Horcón and Ezequiel Ordóñez are located will show similar conditions of oil accumulation.

If such hypothesis actually becomes a fact, then the oil reserves of Petróleos Mexicanos will be enormously enlarged.

CMC

Pumps

. . . . FOR THE OIL INDUSTRY



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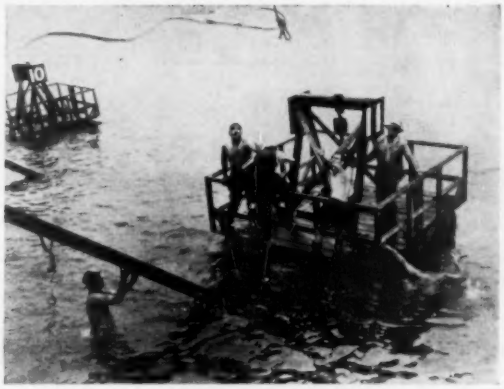


DRUMS ARE ATTACHED to line to give buoyancy, left. Right: One of the winch rafts used to lower the line.

Underwater line laid in record time . . . 4 hours

AN underwater crude-oil line was laid recently across Durban Harbor in South Africa, in what is believed record time—only 4 hours.

The 1,050-ft., 16-in. line, laid by Foster Wheeler Corp. construction crews, will carry fuel oil from terminal facilities of Standard-Vacuum Refining Co. of South Africa, (Pty.) Ltd., from the mainland to a harbor terminal for ship bunker loading at the main Durban city docks.

Preparing the line . . . A 5-ft.-deep trench was dredged across the harbor channel to accommodate the pipe line. Average depth of the channel bottom was 32 ft. Pipe was welded at the refinery terminal into a single 1,050-ft. tube, then wrapped with a series of pipe coatings which have proven effective against marine teredos and minimize electrolytic corrosion.

Mechanical protection during laying of the line was afforded by covering each joint with a series of longitudinally arranged pipe slats which were held in place by circular bands of wire. These are expected to break loose eventually.

Pipe floated . . . The difficult job of floating the pipe line into the harbor from the welding yard on the refinery side of the harbor was accomplished by use of pairs of oil drums, placed at intervals along the 1,050-ft. piece of pipe. Drums were wired to the circular bands enclosing the wooden-slat coverings. The drums were removed from the line before lowering-in operations began.

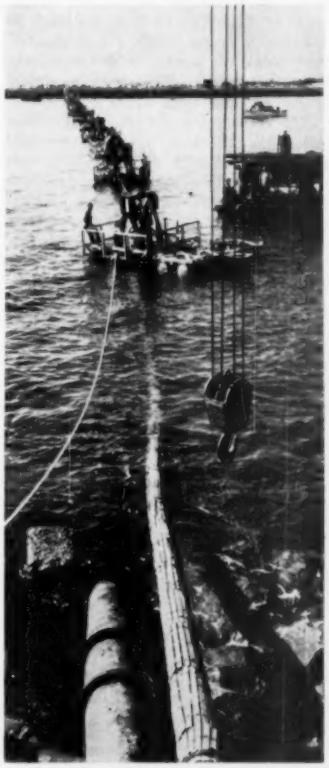
Rafts guide line . . . Next, 12 identical winch-equipped rafts, especially constructed, were moved out to the point of line crossing. Each raft was anchored into position at 80-ft. intervals across the harbor, and joined one with the other by cordage cable.

Lowering-in was done by the winch mounted in the center of each raft. Flexibility of the long piece of welded pipe lying in the surging waters complicated the task of the rigging crews working on each raft, but the job was accomplished quickly. The harbor had been cleared of all shipping prior to start of the operation.

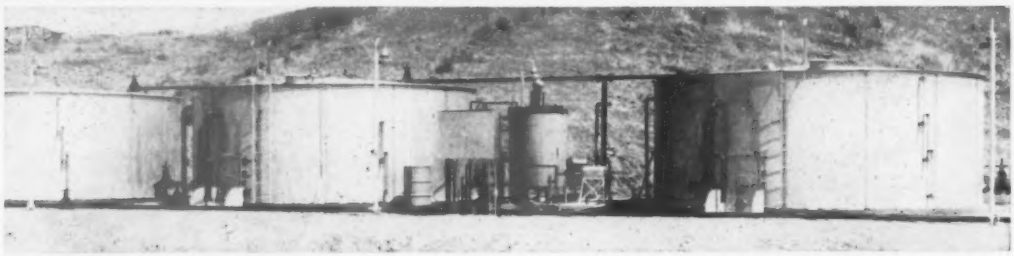
With the line laid securely in its 5-ft. trench, the end joint was tied into a pivot position at the storage-tank terminal. The covering of wooden slats, placed on the line to prevent mechanical damage to the pipe during laying, was allowed to remain on the line.

The final step in the laying operation was removal of the winch rafts. These were towed back to shore by river boat when the job was completed.

The pipe line serves the new Stanvac plant which will have a design capacity of 15,600 bbl. of crude daily. When completed, the refinery will represent an investment of more than $17,000,000. Operations are due to start late this year.



VIEW of harbor crossing, showing wooden wrapping around pipe to protect it from mechanical damage during lower-in operation.



AT THIS NEW Newhall-Potrero field central disposal plant, suspended oil is removed from the brine in the tank at left above. The water accumulates in the center tank, is pumped through the filtering unit, then collects in the third tank for pumping into the disposal well.

Automatic Brine-Disposal Plant Small But Efficient

D. H. Stormont

NEW salt-water-disposal facilities recently completed by Sunray Oil Corp. in Newhall-Potrero field northwest of Los Angeles are designed to assure that water injected into a small fault-block oil pool will be chemically stable and free of impurities which might plug the tight sands.

The central disposal plant and water-separating facilities are operated under slight pressure so that air is isolated from the brine at all times during its brief stay aboveground. Chemicals are used to stabilize the water, and a diatomaceous-earth filter assures removal of any suspended materials before the water is pumped to the input well.

The new facilities also are of interest because they reflect the more stringent demands made by California waste-disposal bodies in their efforts to prevent pollution of surface waters and arable lands.

Small output . . . The entire water output of Newhall-Potrero is only 350 bbl. daily, and is not likely to exceed 500 bbl. daily within the next 2 years. But because the field is situated in an agricultural area, disposal authorities said even this small amount would cause pollution if permitted to enter surface water-bearing sands. Too far from the Pacific Ocean for the brine economically to be pumped or hauled there, reinjection thus was the logical solution.

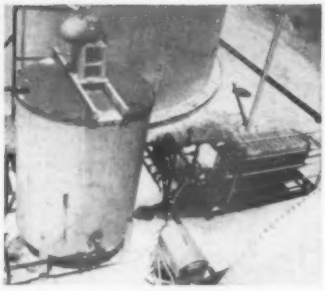
Chemical treatment used . . . At the tank battery handling the bulk of the field's water output, a polyphosphate and sulfonated lignin compound is injected into the separated brine for the purpose of keeping carbonates and other such compounds in solution. Likewise a bacteria and algaecide is induced by a small chemical pump. Excessive amounts of both chemicals (Nalco 82 and Arquad 2-C, respectively) are injected so that when this water unites with that from other batteries at the central plant there is sufficient for all.

The field's water output is collected in a 500-bbl. skimming tank. Freed of any remaining oil, the brine leaves the tank through a water leg and flows into a second 500-bbl. tank from which the filter pump takes suction. The clear water then collects in a third 500-bbl. tank, and from there is moved to the injection well by an engine-driven triplex pump.

So that air cannot contact the brine a gas blanket is maintained in the three tanks, which are interconnected by a balance line. A pressure regulator set to hold about ½ oz. on the system automatically feeds dry gas into the tanks whenever pumping or the opening of a hatch causes the pressure to fall below this level. Relief vents prevent excessive pressures from being built up in the tanks.

Filtering facilities . . . These consist of a sheet-type diatomaceous earth unit. The filter is made up of 25 asbestos pads, interspaced with headers and screens, which provide a filtering area of about 75 sq. ft.

A small proportioning pump automatically injects a slurry of the filter aid into the unfiltered water just before the latter enters the unit. Amount of slurry (which is batch-mixed once weekly in a paddle-equipped tank) injected per barrel of brine is manually controlled but once adjusted the ratio is automatically maintained.



DIATOMACEOUS-earth slurry kept in the stirrer-equipped tank is proportioned into the unfiltered water just before it enters the sheet-type filter unit. Deposited out on the filter pads, the media assures thorough removal of all solids.

The earth is deposited on the filter sheets, building up an incompressible mass of filtering media to assure that all solids will be removed. As more and more of the material deposits on the pads, the pressure drop through the filter increases. When this drop reaches approximately 20 psi. the filter is torn down and new pads inserted.

Tight formation . . . The formation receiving the brine consists of three very tight, fine-grained sands separated by shale breaks. Water is being injected through perforations at 6,532-6,830 ft. in a Zone 1 well which has been plugged back to that depth. As a Zone 1 well, it swabbed only water, and little of that. Other Zone 1 wells produce small amounts of water but bulk of the field's water output is from deeper Zone 3 wells.

Treated and filtered water is injected into this input well by means of a gas-engine-driven triplex pump. Equipped with 2-in. liners and operating at slow speeds, the pump discharges approximately 35 g.p.m. at 2,000 psi. After having received more than 15,000 bbl. of water, there has been no noticeable increase in the required injection pressure.

A COUPLED M-SCOPE in operation. Transmitter is at rear, receiver in front.

M-SCOPE TRANSMITTER and receiver are used separately to trace a buried line.

Electronic "Pipefinder"

M-Scope locates buried metal pipes, cables, other such objects around refinery installations and in the field

George M. MacLeod*

MANY amazing and useful devices have come out of the field of electronics, and among them is the M-Scope, more commonly known as a "pipefinder."

Although some of the apparatus working in industrial jobs require highly trained technicians in their operations, others are relatively simple, requiring but little training for their operators. The pipefinder falls into the latter category.

The principal oil-industry application of the pipefinder, as the name suggests, is for locating buried metal pipes, cable, and other similar objects. Some of the common uses for the instrument are:

1. Locating position of a single pipe with or without other pipes in the immediate vicinity.
2. Locating and tracing a given pipe through a maze of other pipes.
3. Location of laterals, stubs, and valve boxes.
4. Location and depth of buried power conduits.
5. Location of abandoned oil wells where the casing has been cut off below the surface and then covered over with soil.
6. Location of isolated buried objects such as manhole covers, and other miscellaneous metal objects.

Useful in refineries . . . There are many occasions where the instrument can be applied to difficult field problem in the ordinary course of refinery and pipe-line operations. With few exceptions refinery and distribution sites abound with underground facilities, the location of which are unknown. A pipe line or service cable which has been buried a few years can often be lost as to its exact location. Such situations usually result in hazards which are compounded when excavations for expansion of the plant or distribution site is to be carried out.

A pipefinder will make certain that no overlooked pipe lines, power con-

SONIC LEAK DETECTOR in operation. Sound generated by escaping fluids is detected, amplified so leak may be accurately located.

*Fischer Research Laboratory, Inc., Palo Alto, Calif.

duits, or communication cables lie in the path of proposed excavations. Time-consuming delays can be avoided in the installation of underground-storage facilities if the site is carefully checked before actual excavation is started. Exact knowledge of metal subsurface objects existing at the given site often result in large savings to contractors.

Characteristics . . . Basically the pipe-finder unit consists of a portable radio transmitter in conjunction with a portable, radio - direction - finder - type receiver. The transmitter induces an electromagnetic field either inductively or conductively into any buried metallic object within its range. Location and depth of a buried metal object is found by detecting and studying this electromagnetic field. The instrument is portable and rugged enough for extended field use. It can be used effectively by one man although for some applications two men are preferred.

Used together . . . When locating individual pipes or metal objects the receiver and transmitter are generally used as a single unit. In actual field operations when using the transmitter and receiver coupled together the instrument is first electrically balanced over barren ground so that there is a null or minimum tone in its receiver earphones. The instrument is then moved in a line normal to the supposed direction of the lost pipe line.

When the "lost" line is crossed the instrument's receiver will detect the field induced in the pipe. This results in a loud buzzing in the receiver earphones. Once the pipe is located its depth and direction can be easily determined.

Practical depth range of the equipment is from 15 to 20 ft. depending somewhat on the size of the object sought and on local ground conditions.

Accurate . . . The instrument is sufficiently accurate to literally pin point the lost pipe line or the center of the lost metal object.

The M-Scope is manufactured by Fischer Research Laboratory, Inc., Palo Alto, Calif. This organization also manufactures a sonic-type leak detector which operates by amplifying the sound produced by escaping fluids.

Cleaning Burners

Socony refiner's suggestion on cleaning of oil burners before being taken off the line results in huge savings

COMPLETE cleaning of oil burners before taking them out of service on T.C.C. cracking heaters and vapor reheaters has resulted in substantial savings for Socony-Vacuum Oil Co., Inc., at its East St. Louis, Ill., refinery.

After the burners are cleaned, they are removed and hung in a location convenient for reuse should a gas failure occur.

Oil heaters must be available in case of an inadequate supply of gas. Since only one burner is in use to guard against this failure, the others are kept idle, but they must be kept in proper maintenance so they can be put on the line easily and quickly. The new cleaning method was suggested by C. Beadle.

Dampers should be closed . . . The secondary air dampers through which combustion - air requirements are admitted to the oil burners during times when the burners are in service should be closed during periods when the burners are out of service in order that all air admitted to the heater can be utilized in the most efficient manner. (There are 25 oil burners in a cracking heater and vapor reheater). Entrance of any air into the heater above that required for complete combustion is wasteful of fuel since this air is merely heated from atmospheric temperatures and rejected at stack temperature.

In practice, a minimum of 20 to 40 per cent of excess air (above theoretical quantity required for complete combustion) is generally required due to inefficiency or utilization of the air by the burner.

Beal contended that all air entering through the idle oil burners was excessive and therefore if this air could be excluded a savings in fuel would result.

Rust causes trouble . . . An accumulation of rust and other debris on the oil burner secondary air dampers make it difficult if not impossible to change the damper settings, so the dampers have in the past been maintained in an "open" position to allow combustion air to enter during time when an oil burner is on stream.

Practice has allowed air to enter through the air dampers on idle burners. Beadle proposed a cap to fit over idle burners to exclude this air, and they were so installed.

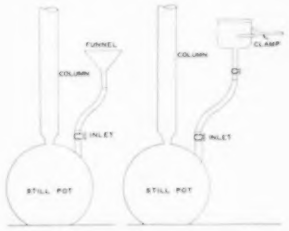
Big savings . . . Savings resulting from elimination of steam from idle oil burners has amounted to $8,030 per year. Savings resulting from fuel saved by not heating steam formerly used for keeping the burners clean has been calculated at $1,450.

Savings resulting from reduction in pipe fitters' time to clean T.C.C. oil burners is $497 per year. Savings resulting from use of caps to cover the idle oil - burner dampers amounts to $11,532 per year.

Here's a Way To Charge Fenske Distillation Columns

A more-efficient means of charging Fenske distillation columns used in laboratory analyses has been devised at Humble Oil & Refining Co.'s Baytown, Tex., refinery.

The method utilizes a 500-ml. graduate with a stopcock at the bottom which is held in position by a standard ring-stand and clamp. The graduate is connected to the Fenske distillation-



OLD METHOD, left; new method, right.

still-pot inlet by a ¼-in. rubber tube *(see right figure in accompanying drawing)*.

The sample is placed in the graduate and allowed to enter the still pot by opening of the stopcock. The laboratory technician is then able to go about charging other samples or to attend to other routine tests.

Previously, the sample was measured in a graduate and then charged to the stillpot through a funnel connected to the inlet by a rubber hose *(left in drawing)*. The technician would be tied down until the still pot was completely charged following this method.

No. 37

by C. F. Koenig, III.*

THE JOURNAL'S WEEKLY
Engineering Reference
SECTION

THE CENTRIFUGAL COMPRESSOR—2

Performance Curves

Description of machinery . . . Centrifugal pipe-line compressors built to date have been of the single-stage type. Fig. 1 of the preceding installment illustrates schematically the proportions and construction of a typical, single-stage pipe-line compressor. The inlet and discharge flanges of this compressor are located on the same center line for convenience in laying out multiple-unit compressor stations. The impeller is overhung on a "stiff" shaft, which rotates in pressure-lubricated sleeve bearings and is positioned axially by a Kingsbury thrust bearing. The rotor bearings and shaft seal are assembled in a barrel, which is so arranged that the entire assembly can be removed in one piece. A removable end cover is provided on the case to allow removal of the barrel assembly.

No gas leakage from the compressor can be tolerated. To meet this requirement, a considerable portion of the development effort on pipe-line compressors has been devoted to producing a reliable shaft seal. Fig. 2 of the preceding installment shows schematically a typical seal system for this type compressor. In principle, the object of this system is to provide a chamber between the interior of the compressor case and atmosphere which is kept filled with oil at a pressure slightly higher than the gas pressure within the case. Oil leakage from this chamber is kept to a minimum by close-clearance bushings, by contact seals or, as shown in the figure, by a combination of the two.

The seal system shown is a simplified version of one which has been used very successfully by the author's company in all of its pipe-line compressors to date. The contact seal allows oil leakage of the order of 500 cc. per hour, or about 3 gal. per day, while the bushing seal passes 3 to 4 g.p.m. in this arrangement. The contact seal, while considerably more expensive, is considered well worth while on the compressor end of the seal because of the difficulty of successfully removing large quantities of leakage oil from the area between the seal chamber and the compressor case. On the atmospheric end of the seal chamber drainage is no problem, and the bushing seal is then more appropriate.

Pipe-line operators think of performance in terms of standard cubic feet of gas per day, pressure ratio, and horsepower. However, the quantities which define the performance of a centrifugal compressor are actual volume flow, work per pound of fluid, and efficiency. Attempts to generalize performance in pipe-line terminology have not yet been entirely successful.

A basic plot for estimating purposes is that shown in Fig. 1 on this page. This curve shows the horsepower per million standard cubic feet of gas per day for single-stage centrifugal compressors in series operation. One correction scale is provided to account for the supercompressibility effect at various inlet pressures, while another correction is necessary to account for the effect of inlet temperature variations. This curve is prepared for identical compressors in series and assumes a half per cent pressure loss between each machine.

Fig. 2 shows a generalized plot of centrifugal-compressor performance in terms of volume flow, work per pound of fluid (head) and a pseudo-dimensionless horsepower function. This curve is perfectly general, and can be applied to any centrifugal compressor of the same general design. Having a curve of this type, it is necessary to know only the design point, or 100 per cent values, of the variables in order to define completely the performance of the compressor.

*De Laval Steam Turbine Co. Presented at A.S.M.E. meeting, Kansas City, Mo., 1952.

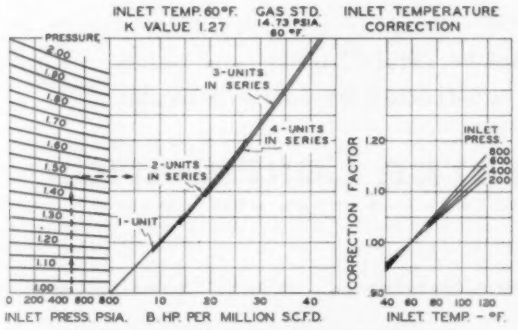


Fig. 1—Power requirements for single-stage compressors.

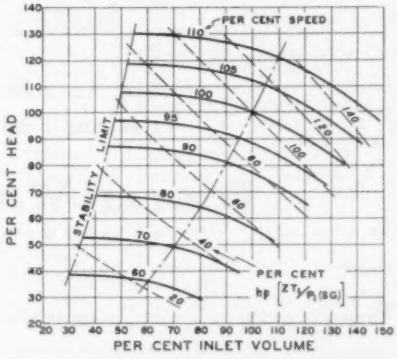
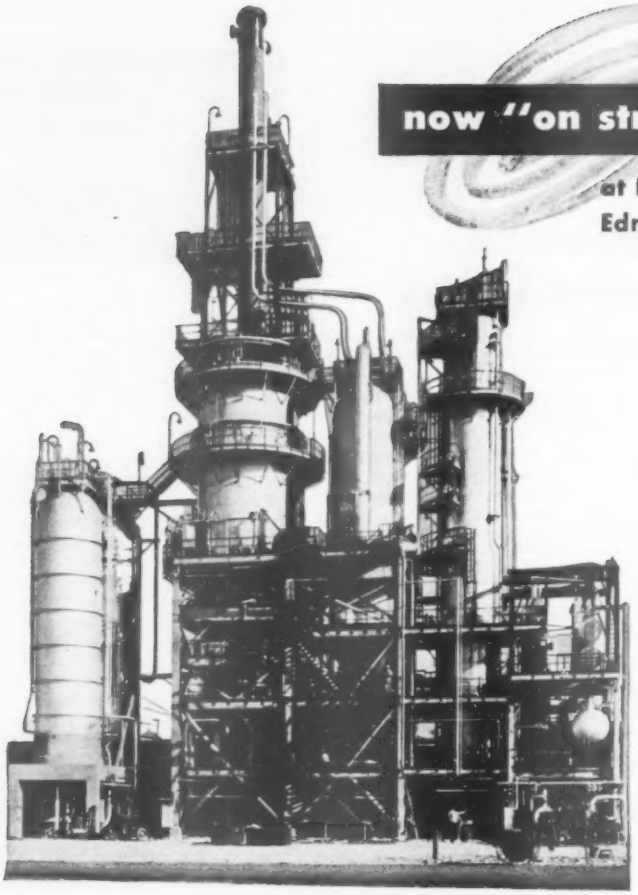


Fig. 2—Typical performance of single-stage compressor.



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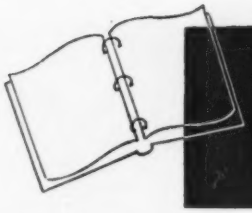

REFINER'S NOTEBOOK

More on Military Jet Fuels

SPECIFICATIONS for the various grades of U. S. turbojet fuels were listed in the Refiner's Notebook, No. 152 *(The Oil and Gas Journal, January 5, 1952, page 351)*. Properties of jet fuels in current supply were also listed in this table.

Jet fuel grades . . . The JP-1 grade is used only for older models of jet aircraft and will be discontinued. (The JP-2 grade was discontinued several years ago.) The JP-1 specification calls for a relatively narrow-boiling-range (kerosine) stock.

The JP-3 specification was drawn to permit blending of gasoline stocks with cracked material. Note that for JP-3 and the other grades a bromine number of 30 is specified as compared to a bromine number of 3.0 maximum for JP-1.

The JP-4 grade supplies most jet aircraft at present. This is essentially a JP-3 fuel but a lower vapor pressure (2-3 psi. R.v.p.) is specified.

In the words of Krause:[1] "The vapor pressure limits the amount of volatile components, while the freezing point limits the amount of kerosine or distillate in the blend. Between these points there is wide latitude. The refiner can produce jet fuel . . . up to 40 per cent of crude run . . . to JP-4 specifications."

The JP-5 grade is currently being supplied in limited quantity. Of significance here is that the freezing-point specification has been raised to —40° F. and distillation range changed accordingly. (Note that 90 per cent point for JP-5 as reported in article by Kelley[2] was in error. Correct transcription of the JP-5 specification was given in Table 1 of the preceding installment.)

Straightrun blends . . . Reference to that table shows the low bromine numbers for JP-3 and JP-4 fuels currently being supplied. Jet fuels are currently manufactured almost entirely as blends of straightrun kerosine and naphtha with stabilized gasoline. The gasoline going into the JP-4 blend should have a Reid vapor pressure of about 5 psi. to give a 2-3 psi. finished jet fuel as specified by MIL-F-5624-A.

Further comment has been given by Krause[1] and others with regard to the blending operation and the handling of jet fuel in isolated tank and line systems with precautions which must be taken to insure production of a clean, dry fuel.

Cracked blends . . . While jet fuels presently are virtually always made up of straightrun materials, it has been noted[4] that: "There are spot cases, however, where cracked materials run as high as 50 per cent, essentially all of which is thermally cracked stock." Blending with cracked stocks on a large scale is contemplated in time of emergency, the JP-3 and JP-4 specifications being drawn up with this in mind. In the event such blends are made, attention must be directed toward stability of blends as well as bromine number.[5] Gum deposits (insoluble gum) would have an effect on the turbine engine fuel system (fuel filters, valves, and metering pumps). Soluble gum may also affect operation of fuel valves (where there is fuel leakage in very small amounts and consequent evaporation).

Exactly how important the gum specification is in relation to engine performance is not fully known. In laboratory testing it is thought that more accurate test methods for measuring existing gum must be devised. The existent or residue gum must be determined by steam jet (see A.S.T.M. D-381-50 as used for burning or diesel oils) as well as air jet. A compact laboratory installation can be set up so that either air or steam can be supplied to the equipment as necessary.[14]

"All out" jet fuel . . . It is assumed that in the case of emergency, large volumes of 400° F. end-point material now going into motor gasoline would be diverted to jet-fuel production. With large capacity of catalytic cracking in operation the quality of motor gasoline will be maintained. The all-out wartime jet-fuel blend might be composed of as much as 75-80 per cent of lower-octane motor gasoline material with kerosine supplying most of the remainder. Blending of catalytically cracked gasoline and of cracked kerosine or other cracked distillates is contemplated, but it is believed that blending of thermally cracked stocks will not be important. As stated by Granville:[4] "In wartime the petroleum industry would . . . have to go into reverse and figure out how best to 'convert' motor gasoline into aviation gasoline, jet fuels, distillates, and residual fuels."

What would be the effect on quality of distillates? This cannot be answered completely. Production of distillates at minimum flash point and of residual fuels with lower-than-normal viscosity may be expected. Diesel fuels and heating oils of lower volatility might be the result of blending larger quantities of light fuel-oil range material into jet fuel.

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9. Droegemuller, E. A., World Petroleum Congress, The Hague, 1951.
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11. Gibbons and Jonash (N.A.C.A. paper), A.S.M.E. meeting November 29, 1948.
12. Droegemuller, E. A., N.P.A. meeting, September 11, 1952.
13. Smith, S. B., N.P.A. meeting, Septemper 11, 1952.
14. The Oil and Gas Journal, April 14, 1952, p. 177.

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GALVANIC CORROSION—2*

A,B,C's of Galvanic Cells

IN order to identify the various parts of galvanic cells, consider a galvanic cell at some point along a pipe line. (Fig. 3). The moist earth becomes the electrolyte; two places on the pipe surface are the anode and cathode; and the pipe wall takes the place of the wire connecting the two electrodes. Where the current leaves the pipe, the anode area, the pipe will be corroded just as the zinc was corroded in the flashlight battery. Where the current returns to the pipe, the cathode, a thin film of hydrogen will be deposited on the surface of the pipe just as it tries to deposit on the carbon cathode of the dry battery. The cell, therefore, becomes less active, and the rate of corrosion has been reduced.

Fig. 4 is an enlarged view of the anode, the area at which current is flowing from the pipe to the ground (electrolyte). As the current leaves the surface of the anode, it carries with it small particles of metal (ions). These ions go into solution in the soil (electrolyte) and are immediately exchanged for hydrogen ions, leaving the iron behind as a rusty scale or tubercle around the pit area. Sometimes this barnacle-like scab will "seal off" the pit to the extent that the ions (electric current) can not get through, and the cell becomes inactive so long as the tubercle is not disturbed.

Galvani's original cell was formed by dissimilar metals, so let us look for such a dissimilarity along our own pipe lines. Probably one of the first to come to mind will be the use of an iron-body brass-core, or an all-brass stop, in a steel service line. In this cell (Fig. 5) the brass will be the cathode and the steel pipe the anode. Current will flow from the steel pipe into the ground and onto the brass core or stop, returning through the metal to the anode. Where the current leaves the pipe (anode), it carries metal particles with it, and the pipe on each side of the brass will be corroded. It is fortunate in this case that the area of the brass core or stop (the cathode) is small with respect to the steel pipe surface, the anode, and the corrosion is not ordinarily severe or rapid.

Other conditions being equal, the ratio of the area of the cathode to the area of the anode is a controlling factor in the rate of corrosion. Generally, if the cathode is small in area as compared to the anode, the corrosion rate will be slow. Conversely, if the area of the cathode is large as compared to the anode, the corrosion rate will be rapid.

Lines of copper connected to steel lines may also provide the metallic dissimilarity for a galvanic cell. The copper line is actually protected at the expense of, that is to say, by the corrosion of, the steel line, in some cases.

One of the most prevalent and least considered galvanic cells due to dissimilarity of metal is created by installing a piece of new pipe in an old line (Fig. 6). The new pipe always becomes the anode, and its rate of corrosion will largely depend upon the type of soil and the relative areas of the anode and cathode. If a very short piece of new pipe were installed, the corrosion may be accelerated because the small anode will be required to supply current to satisfy the much larger cathode area of the old line.

*Taken from A Manual on Underground Corrosion, Columbia Gas System Service Corp.

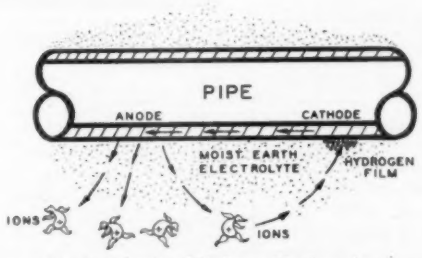

Fig. 3—Galvanic cell, hydrogen film formation.

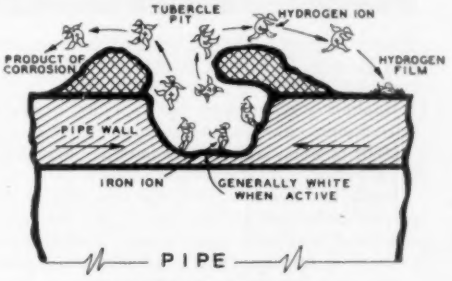

Fig. 4—Galvanic cell, pit action.

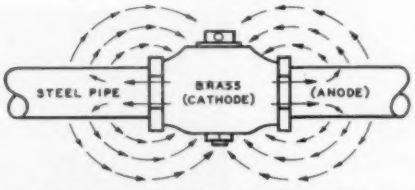

Fig. 5—Corrosion caused by dissimilar metals.

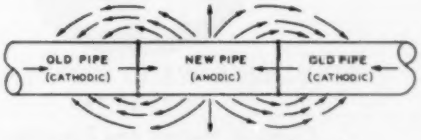

Fig. 6—Corrosion due to dissimilar metal.

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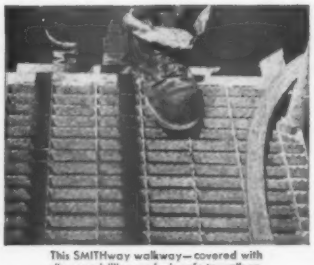

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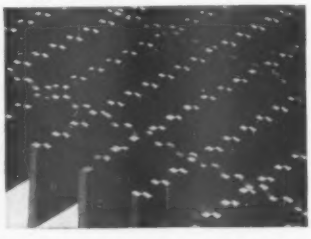
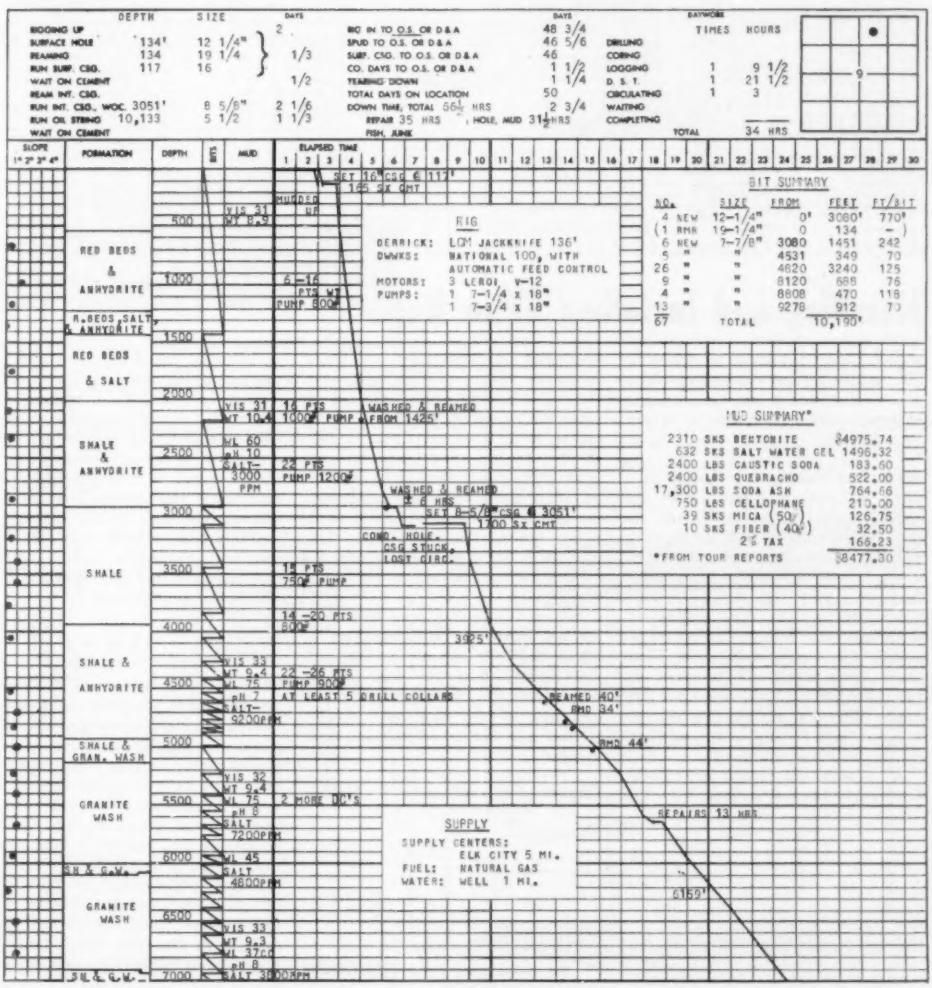


Anadarko Basin Drill Log
(Southwest Portion)

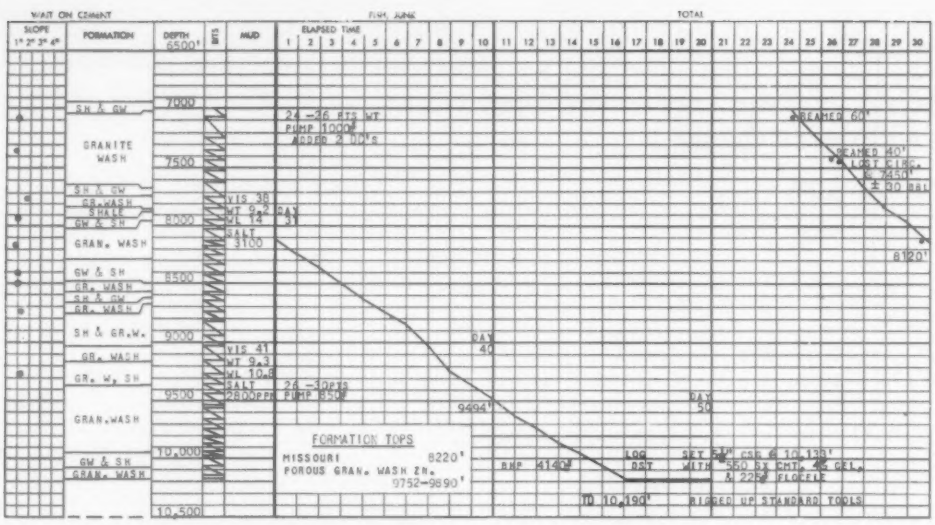
Contractor: Shell Oil Co.
Operator: Shell Oil Co.
Well: 5 McKenzie
Location: Section 9-10n-21w, Elk City Pool, Beckham County, Oklahoma.


DEPTH SIZE DAYS
RIGGING UP 2
SURFACE HOLE 134' 12 1/4" } 1/3
REAMING 134 19 1/4 }
RUN SURF. CSG. 117 16
WAIT ON CEMENT 1/2
REAM INT. CSG.
RUN INT. CSG., WOC 3051' 8 5/8" 2 1/6
RUN OIL STRING 10,133 5 1/2 1 1/3
WAIT ON CEMENT
RIG IN TO O.S. OR D&A 48 3/4
SPUD TO O.S. OR D&A 46 5/6
SURF. CSG. TO O.S. OR D&A 46
CO. DAYS TO O.S. OR D&A 1 1/2
TEARING DOWN 1 1/4
TOTAL DAYS ON LOCATION 50
DOWN TIME, TOTAL 56½ HRS 2 3/4
REPAIR 35 HRS , HOLE, MUD 31½ HRS
FISH, JUNK
DAYWORK TIMES HOURS
DRILLING
CORING
LOGGING 1 9 1/2
D. S. T. 1 21 1/2
CIRCULATING 1 3
WAITING
COMPLETING
TOTAL 34 HRS
SLOPE 1° 2° 3° 4°
FORMATION
DEPTH
BITS
MUD
ELAPSED TIME 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
RED BEDS & ANHYDRITE
R.BEDS, SALT & ANHYDRITE
RED BEDS & SALT
SHALE & ANHYDRITE
SHALE
SHALE & ANHYDRITE
SHALE & GRAN. WASH
GRANITE WASH
SH & GrWa
GRANITE WASH
SH & GrWa
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
SET 16" CSG @ 111'
125 SX CMT
MUDDED UP
VIS 31 WT 8.9
6-16 PTS WT PUMP 800#
VIS 31 WT 10.4 WL 60 pH 10 SALT-3000 PPM
16 PTS 1000# PUMP FROM 1425'
WASHED & REAMED
22 PTS PUMP 1200#
WASHED & REAMED 2 HRS
SET 8-5/8" CSG @ 3051'
1300 SX CMT
COND. HOLE. CSG STUCK. LOST CIRC.
15 PTS 750# PUMP
14-20 PTS 800#
3925'
VIS 33 WT 9.4 WL 75 pH 7 SALT-9200PPM
22-26 PTS PUMP 900#
AT LEAST 5 DRILL COLLARS
REAMED 40' RMD 34'
RMD 44'
VIS 32 WT 9.4 WL 75 pH 8 SALT 7200PPM
2 MORE DC'S
WL 45 SALT 4800PPM
REPAIRS 13 HRS
6159'
VIS 33 WT 9.3 WL 37cc pH 8 SALT 3800PPM
RIG
DERRICK: LOY JACKKNIFE 136'
DWKS: NATIONAL 100, WITH AUTOMATIC FEED CONTROL
MOTORS: 3 LEROI V-12
PUMPS: 1 7-1/4 x 18" 1 7-3/4 x 18"
BIT SUMMARY
NO. SIZE FROM FEET FT/BIT
4 NEW 12-1/4" 0' 3080' 770'
(1 RMR 19-1/4" 0 134 —)
6 NEW 7-7/8" 3080 1451 242
5 " " 4531 349 70
26 " " 4620 3240 125
9 " " 8120 685 76
4 " " 8808 470 118
13 " " 9278 912 70
67 TOTAL 10,190'
"MUD SUMMARY"
2310 SKS BENTONITE $4975.74
632 SKS SALT WATER GEL 1496.32
2400 LBS CAUSTIC SODA 183.60
2400 LBS QUEBRACHO 522.00
17,300 LBS SODA ASH 764.66
750 LBS CELLOPHANE 210.00
39 SKS MICA (50#) 126.75
10 SKS FIBER (40#) 32.50
2% TAX 166.23
*FROM TOUR REPORTS $8477.30
SUPPLY
SUPPLY CENTERS: ELK CITY 5 MI.
FUEL: NATURAL GAS
WATER: WELL 1 MI.

(Continued on back of page)

Modern Drilling

Anadarko Basin Drill Log (Continued)



Handling and Installing Wire Rope

GREAT care should be taken in handling and installing wire rope. Otherwise it may become permanently damaged before it is put into service.

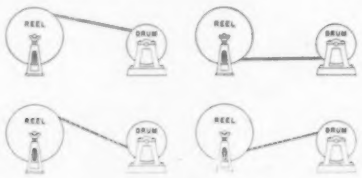
Kinks and kinking . . . Careful handling will prevent kinks, which are almost impossible to remove and result in permanent damage to the rope. If a loop forms in slack rope, it should be thrown out at once, because a kink will develop if this loop is drawn tight. The strands are distorted and become permanently set in this position. Excess wear occurs and wires will fracture at this point. Even if the wires are not badly damaged, the rope is out of shape, which will mean excess wear on the displaced strands.

*From Bulletin C-51, Use and Care of Wire Rope, Leschen & Sons Rope Co.

Unreeling and uncoiling . . . There is always danger of kinking a wire rope if it is improperly unreeled or uncoiled. A reel should be mounted on jacks or a turntable so it will revolve as the rope is pulled off. Sufficient tension should be applied to keep slack from accumulating, by means of a board acting as a brake against the reel flange. Or, the end of the rope may be held by a workman and the reel rolled along the ground.

When transferring rope from one reel to another be sure the rope is taken from the top of the full reel and wound over the top of the empty reel, or from the bottom of one reel to the underside of the second reel. Reverse bends are thus avoided.

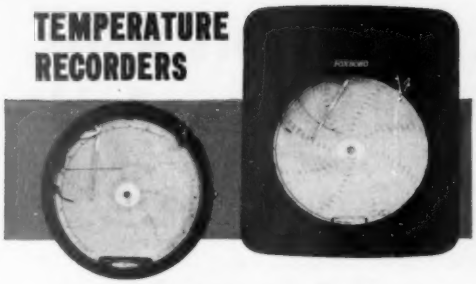
Inspection of equipment . . . Before installation, the drums and sheaves on which the rope is to be used should be carefully examined. A new rope cannot be expected to give good service if the sheaves or drum are badly worn or damaged. If a sheave is out of round or has worn bearings, it will not run true and will damage the rope. Make sure the grooves are smooth and of full diameter. A sheave with a corrugated or pinching groove should be turned out or replaced.



How to wind rope from reel to drum.

Installing . . . It is good practice to wind the rope directly from the reel to the drum, being careful to see that the bends are made in the same direction as when transferring rope from one reel to another. Mount the reel with the axle parallel to the drum and keep it under tension to avoid accumulation of slack. On a smooth-faced drum tension should be applied and the wraps kept close together without crowding. A right-lay rope spools best if wound from left to right over the top of the drum when viewed from the side opposite to that from which the rope is leading onto the drum. If underwound, the rope should lead from right to left.

TEMPERATURE RECORDERS



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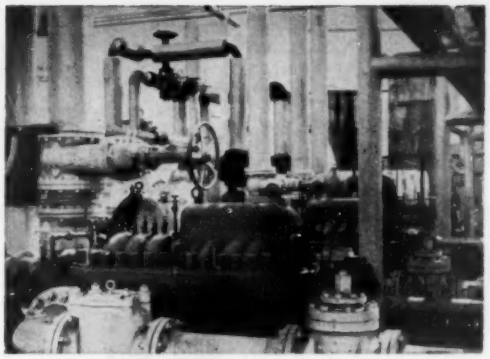

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Management prefers Goulds because they offer so much for the money. Engineers like their sound design and their wide range of ratings at maximum efficiency. Station operators choose Goulds because their simple construction reduces operating and maintenance problems.

Bulletin 722.4 describes the outstanding features of construction and gives complete specifications for Goulds High Pressure Centrifugal Pumps Figs. 3360 and 3365. Write today for a copy.

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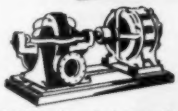

Double-suction, single-stage Goulds centrifugals. Up to 15,000 G.P.M. Heads up to 500 ft. Bulletin 721.2.

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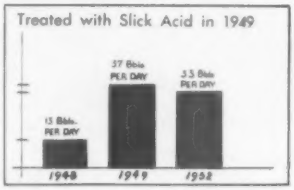
Goulds PUMPS INC. Seneca Falls New York

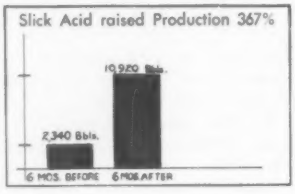
There IS MORE OIL in your old wells, recover it FASTER with Slick Acid*

Case I



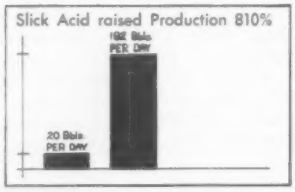
A well in San Andres formation in Howard-Glasscock pool, West Texas, was completed in 1928. It was treated with conventional acid in 1936. In December, 1949, it was treated with Slick Acid. Production was increased from 13 barrels per day to 37 barrels per day. In August, 1952, the well was still producing 33 barrels per day. During 32 months, the well produced 21,120 barrels in excess of its settled production during previous ten years.

Case II



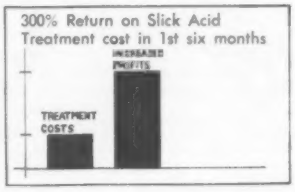
A well in the First Bromide Sand in Golden Trend Field, Garvin County, Oklahoma, was five years old when treated with Slick Acid. During the six months previous to treatment the well made 2,340 barrels of oil. In six months after treatment the well made 10,920 barrels, an increase of 8,580 barrels over the production of the previous six months.

Case III



A well in San Andres Formation in West Levelland Field, Cochran County, Texas, would make only 20 barrels per day after completion and conventional acid treatment. Nine months later it was treated with Slick Acid. The production increased to 182 barrels per day. By increasing allowable to 40 barrels per day, the well produced 15,840 barrels of additional allowable production in three years following treatment.

Case IV



Two wells were treated on a lease in the Levelland Field, Hockley County, Texas. As a result of the treatment the lease production increased 68 barrels per day. At the end of six months, the production had not declined and the cost of the treatments had been recovered three times.

*Slick Acid is an exclusive product of Oilwell Chemical Service Co. Service mark is registered with U. S. Patent Office.

Write for further information on these, and other Case Histories on the use of Slick Acid.

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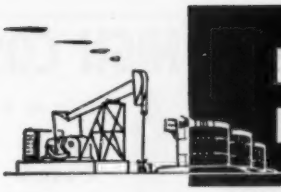


Permeabilities From Capillary Pressure and "Tortuosities"

by Ralph F. Nielsen*

SOME of the relations[1,2,3] between capillary-pressure curves and permeabilities have been derived on the basis of pore-size distribution. For a bundle of uniform, cylindrical, parallel capillaries, the capillary pressure P_c is (Engineering Fundamentals No. 325) $2\gamma \cos \Theta / r$, γ being the surface or interfacial tension, r the pore radius, and Θ the contact angle. From geometry $r/2 = \phi/s$ and from Kozeny's equation $K = \phi^3/ks^2$ where ϕ is the fractional porosity, K the permeability in cm.^{2}, s the specific surface, and k the "Kozeny constant" (Engineering Fundamentals No. 508). Thus for a system of uniform pores:

$$K = \frac{\phi \gamma^2 \cos^2 \Theta}{k P_c^2} \qquad (1)$$

Assume a core to be made up of capillaries of various radii but each capillary of constant radius throughout its length. The pores of a certain radius correspond to a capillary pressure P_c and contribute an amount $\phi \Delta S$ to the total porosity, where S is the saturation with respect to the wetting phase, which was used to determine the capillary pressure curve. The contribution of these pores to the total permeability is, by Equation 1:

$$\Delta K = \frac{\phi \gamma^2 \cos^2 \Theta \Delta S}{k P_c^2} \qquad (2)$$

Substituting differentials for Δ's and integrating, the total permeability is:

$$K = \phi \gamma^2 \cos^2 \Theta \int_0^1 \frac{dS}{k P_c^2} \qquad (3)$$

*Associate professor, petroleum and natural-gas engineering, Pennsylvania State College.

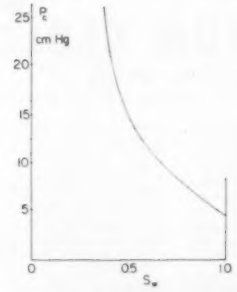


Fig. 1—Capillary pressure-saturation curve.

This presupposes independent flow in the various capillaries.

Equation 3 is the permeability when all pores are full of the flowing fluid, or S = unity. At a saturation S less than unity, the effective permeability, to the wetting phase is:

$$K_w = \phi \gamma^2 \cos^2 \Theta \int_0^S \frac{dS}{k P_c^2} \qquad (4)$$

and the relative permeability from Equations 3 and 4:

$$K_r = \frac{\int_0^S \ldots}{\int_0^1 \ldots} \qquad (5)$$

In determining the usual capillary pressure curve ("drainage curve") the core is first saturated with the wetting phase, such that a positive pressure is required to displace it. The largest pores are emptied of wetting phase first, as shown by the rise in P_c with decreasing S (Fig. 1). Thus the integral taken from 0 to S corresponds to the smaller pores which are those filled with the wetting phase and therefore effective in the flow of that phase at saturation S.

One estimate of t is given by resistivity measurements. For complete saturation the porosity times the formation resistivity factor is a measure of the tortuosity, or $F\phi = t$. As a saturation S the effective resistivity factor $F_e = t_e/\phi S$ where t_e is the effective tortuosity at S. The resistivity index $I = F_e/F = t_e/tS$. Thus $k_o F \phi$, where k_o is 2 or 2.5, is substituted for k in the 0-1 intergrals and $k_e F_e \phi / S$ for k in the 0-S integrals. These quantities (without k_o) are average tortuosities for all pores in the one case and for all pores filled at the integration limit S in the other case. They are therefore taken outside the integrals, giving:

$$K = \frac{\gamma^2 \cos^2 \Theta}{k_o F} \int_0^1 \frac{dS}{P_c^2} \qquad (6)$$

$$K_r = \frac{\int_0^{S_w} \frac{dS}{P_c^2}}{IS \int_0^1 \frac{dS}{P_c^2}} \qquad (7)$$

The integrals are readily evaluated by plotting $1/P_c^2$ against S (Fig. 2). For complete wettability cos Θ is unity. Pressure units in Equation 6 must be in dynes per square centimeter. Values of F and I are obtained from resistivity measurements.

Actually the equations of Wyllie and Spangler differ slightly from Equations 6 and 7, in that they used $(t)^{1/2}$ instead of t in the resistivity relations. That is, F would be replaced by $F^2\phi$ in Equation 6 and IS by I^2S^2 in Equation 7.

Fatt and Dykstra assumed the tortuosity to vary inversely as a power of the radius, or $(t = ar^{-b})^{1/2}$, a and b being determined in accordance with the data. Substitution for r in terms of P_c and assuming $k_o = 2$ gives their equations:

$$K = \frac{\phi (2\gamma \cos \Theta)^{2(1-b)}}{8a^2} \int_0^1 \frac{dS}{P_c^{2(1-b)}}$$

$$K_r = \frac{\int_0^{S_w} \frac{dS}{P_c^{2(1-b)}}}{\int_0^1 \frac{dS}{P_c^{2(1-b)}}}$$

For some cases b was found to be ½, or $P_c^{2(1-b)} = P_c^3$.

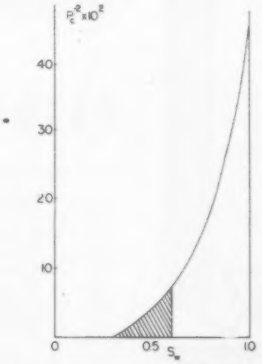


Fig. 2—Plot of $1/P_c^2$ against saturation.

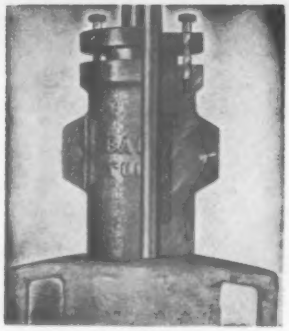
References

1. Purcell, A.I.M.E. 1949, p. 39.

2. Wyllie and Spangler, Bull. A.A.P.G., February 1952.

3. Fatt and Dykstra, A.I.M.E. 1951, p. 249.

Polish Rod Lubricator



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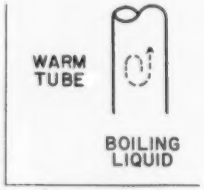
by Dr. B. E. Lauer, Head, Department of Chemical Engineering, University of Colorado

h_f HEAT TRANSFER

COEFFICIENT of HEAT TRANSFER through FILM between INSIDE SURFACE of WARM TUBE and a BOILING LIQUID



Tube Position: Vertical

Liquid Movement: Natural Convection.

EQUATION:

$$h_f = 1.25\left[c + d q\right]$$

TERMINOLOGY:

h_f - Film coefficient of heat transfer, BTU/hr. sq. ft. °F.

c-d - Constants depending on liquid boiling at atmospheric pressure.

q - Rate of heat flow BTU/hr. sq. ft.

h_a - Heat transfer coefficient at standard atmos. cond.

p_a - Pressure at standard atmospheric condition.

LIMITATIONS:

Actual value depends on surface. Values above for clean copper surfaces. Values satisfactory except for extremely high or low rates of heat transfer.

SPECIAL DATA: For heat transfer at pressures other than atmospheric.

Ratio h/h_a	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2
Liquid	Evaporation temperatures - °F								
Water	95	127	154	173	188	200	210	220	229
24% sodium chlor.soln.			178	191	204	214	222	229	237
10% sod. sulphate soln.	125	148	168	180	190	200	211	218	226
26% glycerol		145	168	184	197	207	215	226	237
Carbon tetchl.		91	103	116	136	153	168	180	190
Methanol		66	90	108	125	138	148	156	161
Kerosene			362	380	398	417	428	432	

Values of constants c and d.

Liquid	c	d	Liquid	c	d
Water	190	0.043	24% sodium chlor. soln.	100	0.030
Ammonia	190	0.042			
10% sodium sul.soln.	125	0.045	Carbon tetrachloride	50	0.025
26% glycerol	125	0.045	Normal butenol	50	0.025
Kerosene	100	0.030	Methylene Chlor.	50	0.025
Methanol	100	0.030	Methyl formate	50	0.025
Ethyl ether	50	0.025			

SPECIAL CASE: For liquids not reported above an approximation of heat transfer coefficients can be obtained by use of the following equations:

$h = 24\ (q)^{1/4}$ q up to 5000 BTU/hr. sq. ft.

$h = 0.8\ (q)^{3/4}$ q from 5000 to 75,000 BTU/hr. sq. ft.

and for pressure corrections:

$$h = h_a\ (p/p_a)^{0.4}$$

For water in boiler tubes at atmospheric pressure:

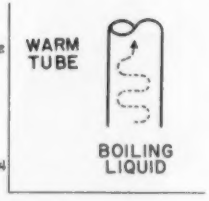
$h = 240 + 0.004\ q.$

REFERENCES:

1. Introduction to Heat Transfer, Brown & Marco, pp. 125-127.

E 6 a

COEFFICIENT of HEAT TRANSFER through FILM between INSIDE SURFACE of a HEATED TUBE and BOILING LIQUID



Tube Position: Vertical

Liquid Movement: Turbulent

EQUATION:

$$h_f = 0.029\,\frac{k}{D}\left[\frac{DV\rho}{\mu}\right]^{0.8}\left[\frac{C\mu}{k}\right]^{0.4}$$

TERMINOLOGY:

h_f - Coefficient of heat transfer, BTU/hr. ft.^{2} °F.

D - Inside diameter of tube, ft.

k - Thermal conductivity of liquid, BTU/ft. hr. °F.

V - Velocity of liquid movement, ft./hr.

ρ - Density of liquid, lbs./ft.^{3}

μ - Absolute viscosity of liquid, lbs./hr. ft.

C - Specific heat of liquid, BTU/lb. °F.

LIMITATIONS:

Valid for fluids with viscosities of not more than twice that of water and where the Reynolds number ($DV\rho/\mu$) is greater than 65,000. For water this will be above 3.4 ft./sec. at inlet to tube.

USES: Applicable to water tube evaporators and boilers.

SPECIAL CASE: For water flowing at velocities below 3.4 ft./sec. constant 0.029 should be changed to 0.0322.

SOURCES OF DATA:

For physical constants for use in above equation see Chemical Engineers' Handbook - J. H. Perry (1948).

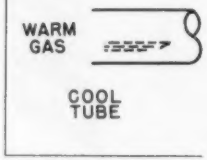
for ρ -- see pp. 130-148, 175-195, 1583.
μ -- see pp. 370-374, 1198, 1696.
k -- see pp. 459-461, 1303, 1697.
C -- see pp. 225-235, 297, 1588, 1696.

REFERENCES:

1. Heat Transmission, W. H. McAdams, p. 221 (1942).
2. Trans. A.I.Ch.E., pp. 761-776, Vol. 42, (1946).
3. Trans. A.I.Ch.E., pp. 362-387, Vol. 33, (1937).

E 6 e

COEFFICIENT of HEAT TRANSFER through FILM between INSIDE SURFACE of a COOL TUBE and WARM GAS



Tube Position: Horizontal

Gas Movement: Streamline Flow

EQUATION:

$$h_f = 1.62\,\frac{k}{D}\left[\left(\frac{\mu}{\mu_f}\right)^{\frac{1}{3}}(1 + 0.015\,Z^{\frac{1}{3}})\right]\left[\frac{4wC}{\pi kL}\right]^{\frac{1}{3}}$$

where $Z = \left[\frac{D^3\rho^2 g(\Delta t)q}{\mu_f^2}\right]$

TERMINOLOGY:

h_f - Heat transfer coefficient, BTU/hr. sq. ft. °F.

k - Thermal conductivity, BTU/hr. sq. ft. °F./ft.

D - Diameter of pipe, ft.

μ - Viscosity at bulk temperature of the stream, lb./hr. ft.; μ_f is evaluated at t_f, μ_s at t_s.

w - Mass rate of flow, lbs./hr.

C - Specific heat at constant pressure, BTU/lb.°F.

L - Heated length of pipe, in ft.

β - Coefficient of volumetric expansion, 1/°R.

Δt - Temperature difference between bulk temperature of fluid and t_s, °F.

ρ - Density, lbs./cu. ft. at t_f.

g - Acceleration due to gravity, 4.17×10^8 ft./hr. hr.

t_s - Temperature of surface, °F.

t_f - Average film temperature, °F, $t_f = 0.5\ (t_s + t)$.

LIMITATIONS:

The equation applies to fluids flowing with Reynolds numbers less than 2100. It is rarely used, since in most applications gases will not move in streamline flow, in which case the equation for turbulent flow will apply.

SOURCES OF DATA: For physical constants for use in above equation see Chemical Engineers' Handbook - J. H. Perry, (1948).

for ρ -- see pp. 130-148, 175-195, 1583.
μ -- see pp. 370-374, 1198, 1696.
β -- see pp. 200-202.
k -- see pp. 459-461, 1303, 1697.
C -- see pp. 225-235, 297, 1588, 1696.

REFERENCES:

1. Colburn, A. P., Trans. Amer. Inst. Chem. Eng. 29, pp. 174-210, (1933).
2. Heat Transmission, W. H. McAdams, pp. 166-192 (1942).

F 1 b

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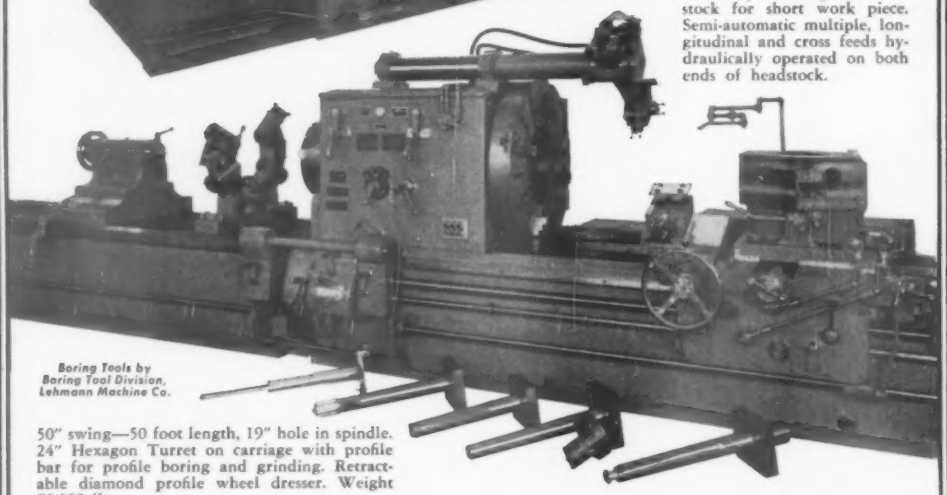

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QUESTIONS ON TECHNOLOGY

by W. L. Nelson
Technical Editor

Imports of Residual Fuel Oil

How much residual fuel oil is imported into the United States and how does it compare with the consumption of fuel oil?—A. J. S.

Very large amounts of residual fuel oil, mainly from Curacao and Aruba in the Netherlands West Indies, and the original source is Venezuela, are imported. In addition, Venezuelan crude oil is also imported and it probably yields 40-50 per cent of residual fuel oil because most of it has a gravity below 25° A.P.I.

Statistics are presented in Table 1. Imports have been increasing steadily except during the years 1942 and 1943 when submarines kept tankers from operating in the Caribbean Sea. Although there is great argument as to the usefulness of such large imports, there are always several useful viewpoints. During the war years, 1941-1946, the imported oil was vital to the welfare of the United States. It may be vital again. Meanwhile, the coal industry and parts of the oil industry of the United States are irked by the vigorous competition that imported fuel oil is creating on the East Coast.

TABLE 1—IMPORTS OF RESIDUAL FUEL OIL INTO THE UNITED STATES AND THE EAST COAST
(Millions of barrels per year)

Year	Imported* from Venezuela or Caribbean	Imported† Venezuelan crude oil	Fuel oil of Venezuelan origin‡	Consumption† U.S.A.	Consumption† East Coast	Percentage of fuel of Venezuelan origin U.S.A.	Percentage of fuel of Venezuelan origin East Coast
1929	21	50.6	46.3	...	...	...	...
1930	26	35.1	43.5	...	...	...	...
1931	25	25.2	37.6	...	...	...	...
1932	21	25.6	33.8	...	...	...	...
1933	13	17.1	21.5	...	...	...	...
1934	13	25.4	25.7	...	...	...	...
1935	16	24.9	28.4	281	...	10.1	...
1936	19	28.2	33.1	308	...	10.7	...
1937	22	23.6	33.8	326	126	10.4	26.8
1938	21	23.9	32.9	292	....	11.3	....
1939	16	27.0	29.5	336	....	8.8	....
1940	33	30.0	48.0	354	...	13.5	...
1941	42	37.6	60.8	395	147	15.4	41.3
1942	22	6.8	25.4	417	....	6.1	....
1943	42	9.7	46.8	497	...	9.4	...
1944	44	36.3	62.2	542	182	11.5	34.2
1945	36	63.2	67.6	554	178	12.2	38.0
1946	50	74.7	83.6	493	182	17.0	46.0
1947	58	80.6	94.2	524	205	18.0	46.0
1948	56	93.8	102.8	508	201	20.2	51.1
1949	76	101.0	117.6	495	220	23.7	53.5
1950	§116	113.0	§161.2	...	229	....	§70.4
§1951	§123	§120.0	§183.0	...	§237	....	§77.2
§1953	...	...	...	...	§241	...	...

*Venezuelan Petroleum Yearbook—1949. Generally substantiated by the Petroleum Data Book and by Twentieth Century Petroleum Statistics—1950. †Twentieth Century Petroleum Statistics (DeGolyer & MacNaughton—Dallas); Albert J. McIntosh. Paper before W.P.R.A., San Antonio, March 27, 1950; and Petroleum Data Book (Petroleum Engineer Publication, Dallas). ‡98 per cent of imported residual fuel oil plus 50 per cent of crude imports through 1945 and 45 and 40 per cent thereafter. §Estimated.

Thermal Efficiency When Firing Oil and Coal

"Is Bunker C fuel oil more efficient than coal?"—R. S.

In very large establishments such as power plants, the thermal efficiency that can be attained is scarcely different for fuel oil from that for coal. The fuel-oil efficiency may be 1 to 4 per cent higher than the efficiency when firing coal, but the Federal Power Commission finds that coal was fired more efficiently than oil during some years.

Holaday et al. ("Fuels—Their Present and Future Utilization," Pet. Processing, November 1949, page 1233) employ the following thermal efficiencies:

	Avg. load Coal	Avg. load Oil	Full load Coal	Full load Oil
Industrial power and heating	33	46	37	51
Industrial heating	60	71	...	...
Steam generation in power plants	22	22	32	32

Other sources indicate the following:

THERMAL EFFICIENCY

Coal	Oil
75	78[1]
50*	70[2]
60-65†	70[2]
50	85[3]
60-65	65-70[4]
61-85	75-85[5]
74	76[6]

*Hand fired. †Stoker fired.

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1. Nelson—The Oil and Gas Journal, July 12, 1951, p. 106.
2. Goodwin—Ref. N. Gaso. Mfr., Nov. 1937, p. 507.
3. Hicks—Power Generation, Dec. 1949, p. 63.
4. McCloud—W. Va. Univ. Bur. of Busi. Research, Vol. 1, No. 4, June 1951.
5. Barnett—Bur. of Mines, Inf. Circ. 7582.
6. Anon.—N.P.N., Oct. 29, 1941, p. R346.

What Is An Asphalt-Base Oil?

"What is an asphalt-base crude oil? I notice that our so-called asphalt-base oil contain very little asphalt."—S. P. L.

The earliest naphthene-base crude-oil fields in the United States contained much asphalt and hence they were called "asphalt base" oils. However, many of the more recent oils of the Gulf Coast and some of the Venezuelan naphthene base oils contain little or no asphalt. Accordingly, it would seem like a useful classification to distinguish between those naphthene-base crude oils that contain large amounts of asphalt (asphalt base) and those that do not (plain naphthene base).

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Pipe-Line Construction

PIPE-LINE activity as reported below by The Oil and Gas Journal is compiled from information received from pipe-line companies and contracting firms.

These projects include those planned, proposed, under way, and contracted. Uncontracted projects are indicated by a • preceding the company name.

Crude-Oil Pipe Lines

• **California-Oregon Pipe Line System**—103 miles, 6-in., proposed, Crescent City, Calif., to Medford, Oregon.

• **Cities Service Pipe Line Co.**—64 miles, 18-in., planned, Sour Lake, Tex., to Lake Charles, La. Completion date April 1953.

• **Cooperative Refinery Association.**—48 miles, 6-in., planned, Phillipsburg, Kans., to Holdredge, Neb. Begin 3-53.

• **Gulf Refining Co.**—55 miles, 10-in., planned, Bay Marchand to Plaquemines, La.

• **Humble Pipe Line Co.**—71 miles, 16-18-in., planned, East Texas to Louisiana-Texas border. (30 miles of 16 in., and 41 miles of 18-in.) Completion date 10-53.

• **Interstate Oil Pipe Line Co.**—22 miles, 18-in., planned, Texas to Shreveport, La.

68 miles, 16-in., planned, Raceland to Anchorage, La. Begin 5-53.

137.6 miles, 22-in., planned, Shreveport to Baton Rouge.

• **Lakehead Pipe Line Co.**—635 miles, 30-in., proposed, Superior, Wis., to Sarnia, Ontario, Canada.

• **Magnolia Pipe Line Co.**—29 miles, 8-in., planned, Midland County, Texas area.

Pan American Pipe Line Co.—27 miles, 26-in., under way, Genoa to Texas City, Tex. Brown & Root. Completion date 3-53.

47 miles 16-in., under way, Arden Station in Irion County to Eldorado Station in Schleicher County, Texas. Vaughn & Taylor constructors. 2-53.

• **Phillips Pipe Line Co.**—45 miles, 12-in., planned, Rancho system to Sweeny, Tex. 3-53.

Phillips Pipe Line Co.—50 miles, 14-in., under way, looping in Duro and Rankin, Tex. area.

• **Progress Pacific Pipeline Co.**—1,100 miles, 24-in., planned, Odessa, Tex., to Los Angeles Harbor, Calif.

Rancho Pipe Line System.—455 miles, 24-in., under way, McCamey to Houston, Tex. Completion date late 1952. (Joint project with Sinclair Pipe Line Co., Pan American Pipe Line Co., Tidewater Pipe Line Co., Nantucket Pipe Line Co., Phillips Pipe Line Co., and Ashland Pipe Line Co. with Shell Pipe Line Corp. handling construction and operation.)

McCamey to Cedar Valley near Austin, Tex. Anderson Bros. Corp. A. Kilgore, spreadman at Menard, Tex.

(Segment 1)—Austin to Shell's Deer Park Refinery (Houston area). Oklahoma Pipe Line Constructors.

(Spread 1)—Pasadena west to Cedar Valley and Austin, Tex. Houston Contracting Co.

• **Roosevelt Oil & Refining Corp.**—22 miles, 4 and 6-in., planned, St. Helens to Norwich, Mich.

• **Service Pipe Line Co.**—16-in., planned, Bowie, Tex., to Drumright, Okla.

30 miles, 6-in., Knox and Haskell counties, Texas.

29 miles, 4-6-8-in., proposed, Natrona County, Wyoming.

170 miles, 12-in., proposed, Tioga to Williston, N. D.

• **Texas-New Mexico Pipe Line Co.**—48 miles, 8-in., planned, from Lovington, N. M.

• **Texas Pipe Line Co.**—34 miles, 6-in., under way, Sour Lake to Port Arthur, Tex.

• **West Coast Pipeline Co.**—960 miles, 20-22-in., planned, Synder, Tex., to Norwalk, Calif.

Products Pipe Lines

• **Bell Oil & Gas Co.**—150 miles, 6-8-in., planned, Ardmore to Drumright, Okla. Completion date 6-1-53.

Buckeye Pipe Line Co.—370 miles, 8-12-16-in., under way, Linden, N. J., via Allentown, Pa., to Auburn, Syracuse, Waterloo, and Rochester, N. Y.

Contracted, Allentown, Pa., to Auburn, N. Y. Completion date 10-53.

Contracted, Auburn to Syracuse, N. Y. Completion date 10-53.

Contracted, Syracuse to Caledonia, N. Y. 10-53.

• **Coastal Products Pipe Line Co.**—260 miles, 20-in., proposed, Houston to Baton Rouge.

• **Continental Pipe Line Co.**—(Yellowstone Line.—600 miles, 8-in., planned, Billings, Mont., to Spokane, Wash.

• **Harbor Products System**—86 miles, 16-in., planned, Woodbury Junction, Philadelphia to Trembley Point, N. J. (Joint ownership of Sinclair Pipe Line Co., Gulf Oil Corp., and Texas Co.)

Indiana Farm Bureau Cooperative Association, Inc.—180 miles, 8-in., under way, Mt. Vernon to Indianapolis, Ind. R. B. Potashnick, contractor.

70 miles, 4-in., under way, Indianapolis to Peru, Ind. R. B. Potashnick, contractor.

• **Phillips Petroleum Co.**—54 miles, 6-in., planned, Goldsmith to Borger, Tex.

52 miles, 10-in., planned, Shell's Brookshire system to Sweeny, Tex.

Pioneer Pipe Line Co.—(Continental Pipe Line Co. and Sinclair Pipe Line Co.). 310 miles, 8-in., under way, Sinclair, Wyo., to Salt Lake City, Utah. R. H. Fulton and Simpson contractors.

• **Progress Pacific Pipe Line Co.**—900 miles, 10-in., proposed, California to West Texas.

Salt Lake Pipe Line Co.—140 miles, 8-in., Pasco to Spokane, Wash. Completion date 6-53.

Sinclair Pipe Line Co.—90 miles, 12-in., under way, Sinco to Port Arthur, Tex. Completion date 3-53.

Standard Oil Co. (Ind.).—316 miles, 12-in., under way, Sugar Creek refinery to Dubuque, Iowa. 1-30-53.

Under way, Polo, Mo., to Unionville, Mo. Sheehand Construction Co. Completion date 1-10-53.

Under way, Unionville, Mo., to Dubuque, Ia. O. R. Burden Const. Corp. Completion date 1-30-53.

Standard Oil Co. (Ind.).—243 miles, 10-12-in., proposed, Whiting, Ind., to River Rouge, Mich.

Sun Pipe Line Co.—110 miles, 8-in., under way, Fostoria to Hudson, Ohio.

• **United States Pipe Line Co.**—1,676 miles, 22-26-in., proposed, Beaumont, Tex., to Newark, N. J.

Beaumont, Tex., to Memphis, Tenn.

Memphis, Tenn., to Louisville, Ky.

Louisville, Ky., to Newark, N. J.

Laterals to Paducah and Lexington, Ky.

• **Wolverine Pipe Line System**—200 miles,

14-in., planned, Chicago to Toledo and Detroit. (Joint ownership of Shell, Texas, and Cities Service).

Natural-Gas Pipe Lines

• **Allied Gas Co.**—24 miles, 6⅝-in., proposed, McLean to Champaign County, Illinois.

• **Arkansas-Missouri Power Co.**—140 miles, 2 to 10-in., planned, St. Francis River, Clay County, Arkansas, to near Campbell, Mo.

• **Associated Natural Gas Co.**—88 miles, Missouri.

• **Carolina Natural Gas Corp.**—185 miles, 2-12-in., proposed, lateral lines off Transcontinental in North and South Carolina.

• **Chattahoochee Natural Gas Co.**—70 miles, proposed, Floyd County, Georgia, to Dalton, Ga.

Cities Service Gas Co.—15 miles, 20-in., Craig County, Oklahoma, to Lawrence County, Missouri.

15 miles, 20-in., Craig County, Oklahoma, to Lawrence County, Missouri.

Cities Service Gas Co.—21 miles, 26-in., planned, Franklin and Anderson counties, Kansas.

• **Coast Counties Gas & Electric Co.**—40 miles, 3, 4, and 8-in., planned. Coast and Valley region, California.

Colorado Interstate Gas Co.—250 miles 20-in., under way, Kit Carson, Colo., to Amarillo, Tex. R .H. Fulton & Co., contractor Pueblo County to Fowler, Colo.

• **Cumberland and Allegheny Gas Co.**—31 miles, 12-in., proposed, Garrett County, Md., to Keyser, W. Va.

Dow Chemical Co.—70 miles, various sizes, Midland, Saginaw, and Bay City, Mich Mahoney Contracting Co., contractor. Ralph Bucher, spreadman at Midland.

• **East Tennessee Natural Gas Co.**—172 miles, 22-in., planned, Greenbrier to Oak Ridge, Tenn.

158 miles, 16-in., planned, Knoxville to Kingsport, Tenn. (58 miles of laterals.) 11-53.

• **El Paso Natural Gas Co.**—822 miles, proposed, Permian Basin, N. M., and West Texas to California.

181 miles, proposed, field transmission lines.

97 miles, proposed, main transmission line on San Juan Basin, N. M. to California.

• **Glacier Gas Co.**—285 miles, 20-in., proposed, Kalispell, Mont., to Spokane, Wash.

120 miles, 16-in., proposed, Spokane to Hanford, Wash.

91 miles, 8⅝-in., proposed, Spokane to Lewiston, Idaho.

130 miles, 12¾-in., proposed, Spokane to International boundary at Trail, British Columbia.

• **Gulf Interstate Gas Co.**—860 miles, 30-in., proposed, Acadia Parish, La., to Boyd County, Ky.

329 miles, 12 to 24-in., proposed. Laterals off Acadia Parish, Louisiana, to Boyd County, Kentucky, line.

• **Home Gas Co.**—32 miles, 12-in., planned, Breesport to Union Center, N. Y.

17 miles, 12-in., proposed, loops from Hancock to Sanford, N. .

46 miles, 12-in., under way, Tioga and Broome counties, New York. H. L. Gentry Const.

22 miles, 12-16-in., under way, Binghampton, N. Y.

• **Hope Natural Gas Co.**—33 miles, 8-10-12-in., planned, Wyoming County, West Virginia, south to Buchanan County, Virginia.

Iowa-Illinois Gas & Electric Co.—41 miles, 10-in., planned, Washington County to Cedar Rapids, Iowa.

• **Kansas-Nebraska Natural Gas Co., Inc.**—179 miles, planned, Kansas and Nebraska.

Behind the Scenes at **PLS . . .**

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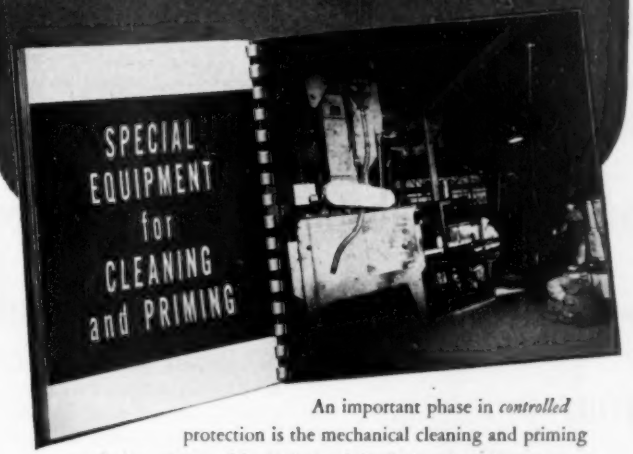

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54 miles, 4-6-in., planned, Neligh to Hartington, Neb. Completion date 1953.

• **Lone Star Gas Co.**—100 miles, proposed, storage fields to the Dallas-Fort Worth area.

35 miles, 12-in., proposed, southeastern Schleicher County. 12-52.

• **Manufacturers Gas Light & Heat Co.**—40 miles, proposed, Allegheny, Washington and Beaver counties, Pennsylvania.

213 miles, 3 to 26-in., proposed, various points on system in Pennsylvania, West Virginia, and Ohio.

• **Michigan Gas Storage Co.**—30 miles, 26-in., planned, Lainsburg Junction north. 7-53.

• **Midsouth Gas Co.**—191 miles, planned Helena to Palestine, Ark.

Missouri Central Gas Co.—25 miles, 6-in. contracted, Moberly to Macon, Mo. L. I. Young Const. Co.

• **Missouri Public Service Co.**—136 miles, 8-10-in., proposed, New Franklin to Trenton, Mo.

• **Montana Power Co.**—52 miles, 16-in., planned, Canada-Montana border to Cut Bank, Mont.

• **Morganfield Natural Gas Co.**—31 miles, 4-6-in., planned, through Sturgis, Providence, Clay, Diamond, Wheatcroft, and Sullivan, Ky.

• **New River Gas Co.**—50 miles, planned Summers to Monroe counties, West Virginia, to Narrows and Dublin, W. Va.

• **New York State Electric and Gas Co.**—59 miles, 8-10-24-in., proposed, Oneonta and Norwich to DeRuyter, N. .

New York State Natural Gas Corp.—104 miles, 14, 16, 20-in., under way, looping on Westmoreland, Armstrong, and Tioga counties, Pennsylvania. (Includes 17 miles, 16-in., in Potter County, Pennsylvania, and 21 miles 14-in., replacement in Line No. 507, New York.)

Utica to Amsterdam, N. Y. (to begin at completion of Zelienople). Williams-Austin. Howard Bauer, superintendent. Completion in 90 days.

Angelica to Rossburg, N. Y. (begin at completion of Cayuta-Ithaca). Williams-Austin. Howard Bauer, superintendent. Completion in 45 days.

Colesburg Junction to Sabinsville, Pa. (begin at completion of Angelica job). Williams-Austin. Howard Bauer, superintendent.

21 miles, Columbiana and Stark counties, Ohio.

• **New York State Natural Gas Co.**—95 miles, 16-20-in., planned, Clinton County to Armstrong County, Pennsylvania.

(Section 1) 16-in., Clinton County, Pennsylvania.

(Section 2) 20-in., Armstrong County, Pennsylvania, begin 1953.

Niagara Mohawk Power Corp.—55 miles, 10-in., begin 4-1-53, Watertown to Syracuse, New York. Williams-Austin Co.

• **Northern Natural Gas Co.**—580 miles, proposed, Kansas, Texas, Oklahoma, and Nebraska loops.

210 miles, 26-in., planned, five loops in Texas-Oklahoma area, two in Kansas, and two in Nebraska.

400 miles, 24-in., proposed, Emerson, Manitoba south to Red River Valley through Fergus Falls on to St. Paul, Minn.

102 miles, planned, extension.

Northern Natural Gas Co.—140 miles, 4-6-8-in., under way, south of Rolla, Kans., to Guymon, Okla. Reese Bros. Const. Co. B. H. Reese, spreadman at Hugoton, Kans.

• **Northern Indiana Fuel & Light Co.**—33 miles, 8-in., proposed, Edgerton to Auburn, Ind.

• **Northwest Natural Gas Co.**—750 miles, planned, Washington, Oregon, and Idaho.

24-in., Eastport, Idaho, to Monroe, Wash.

18-in., Monroe to International boundary near Lynden, Wash.

22-in., Monroe to near Seattle, Wash.

20-in., Seattle to Portland, Ore.

• **Ohio Fuel Gas Co.**—31 miles, 20-in., planned, Licking County to Richland County, Ohio.

22 miles, 16-in., planned, Dayton, Troy, Piqua, and Sidney, Ohio.

23 miles, 16-20-in., planned, Wellington to Elyria, Ohio; 16 miles, 20-in., planned, Benton Station to Crawford Station; 18 miles, 20-in., Crawford Station to near Columbus; 16 miles, 16-in., planned, Berlin to Sandusky, Ohio.

74 miles, 3 to 20-in., planned, Hocking, Knox, and Ashland counties, Ohio.

47 miles, 20-in., planned, Benton Township, Hocking County, to Columbus, Ohio.

61 miles, planned, northern and southwestern Ohio.

33 miles, 20-in., proposed, Jefferson to Seneca, Ohio.

• **Oklahoma Natural Gas Co.**—50 miles, 18-in., planned, Sapulpa to Choteau, Okla. 7-53.

• **Pacific Gas & Electric Co.**—50 miles, 12-16-20-in., planned, Fresno to Merced, Calif.

(Section 1) 16-in., Burrel to near Easton, Calif.

(Section 2) 20-in., Holm to Topock-Milpitas line.

(Section 3) 12-in., parallel existing Madera-Livingston line.

141 miles, 34-in., planned, parallel sections along Topock-Milpitas line.

Planned, Monterey to Fort Ord to Castroville; Napa Wye to Shellville; Cotati to Santa Rosa, Calif.

• **Pacific Northwest Pipeline Corp.**—1,384 miles, proposed, Ignacio, Colo., to Bellingham, Wash.

316 miles, proposed, laterals and spurs off main line to Pocatello, Idaho to Yakima, Wash.

Panhandle Eastern Pipe Line Co.—70 miles, 24-26-in., under way, looping from Sneed, Tex., to Emporia, Kans.

174 miles, 30 and 26-in., contracted. Tuscola, Ill., eastward—looping present system; R. A. Conyes, contractor.

26-in., Edgerton, Mich., Anderson Brothers.

30-in., looping in Tuscola, Ill.

30-in., looping in Montezuma, Ind.

30-in., looping in Zionsville, Ind.

• **Panhandle Eastern Pipe Line Co.**—19 miles, planned, Peoria County, Illinois.

• **Peoples Natural Gas Co.**—25 miles, proposed, Cambria and Blair counties, Pennsylvania.

• **Permian Basin Pipeline Co. (Northern Natural).**—384 miles, 20-30-in., proposed, Permian Basin and eastern New Mexico to Skellytown, Tex.

Upton County, Texas, to Lea County, New Mexico.

Lea County to Roosevelt County, New Mexico.

Roosevelt County, New Mexico, to Carson County, Texas.

• **Phillips Petroleum Co.**—125 miles, 2 to 24-in., planned, Midland, Upton, Glasscock, and Reagan counties, Texas. Completion date 6-53.

28 miles, 10-in., planned, Bayou Plant to Adams Terminal. Completion date 7-53.

Phillips Petroleum Co.—65 miles, 4 to 30-in., under way, Goldsmith field system, Texas. George Tucker, const. Completion date 1-53.

• **Public Service Co. of Colorado.**—95 miles, proposed, Douglas Creek and other gas fields to Grand Junction, Colo., area.

• **Public Service Co. of North Carolina.**—83 miles, 8-in., planned, Kings Mountain to Asheville, N. C. Completion date 3-1-53.

• **Rockland Light & Power Co.**—22 miles, 8-in., proposed, Orangetown to Tompkins Cove, N. Y.

• **Shenandoah Gas Co.**—39 miles, 3-4-8-in., proposed, Middleton, Va., to Martinsburg, W. Va.

• **South Carolina Natural Gas Co.**—160 miles, 16-12-10-in., proposed, Aiken, S. C., to cities of Columbia, Summerville, and Charleston, S. C.

• **South Georgia Natural Gas Co.**—339 miles, 2-12-in., planned, Phoenix, Ala., to Tallahassee, Fla. (a) 12-in., Phoenix, Ala., to Albany, Ga. (b) 10-in., Albany, Ga., to Moultrie, Ga. (c) 8-in., Moultrie, Ga., to Tallahassee.

• **Southern California Gas Co.**—35 miles, planned, Antelope Valley, California.

Southern California Gas Co. and Southern Counties Gas Co. of California.—45 miles, 30-in., contracted, looping on line from Arizona border to Los Angeles. J. B. Gill, 81 miles, 30-in., contracted, Whitewater to Desert Center, Calif. J. B. Gill.

Contracted, looping between Blythe and Colorado River and on westward of Indio. J. B. Gill.

Southern Natural Gas Co.—1,235 miles, 24 to 4½-in., contracted, Louisiana, Mississippi, Alabama and Georgia, and South Carolina. Houston Contracting and H. C. Price. Fall 1953.

Gwinville, Miss., to Franklinton Junction, La.

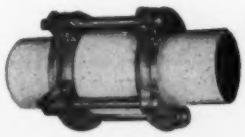
Lateral from Franklinton Junction, La., to Sand Hook Field, Miss.

Franklinton Junction, La., to Duck Lake Gas Field, La.

Duck Lake Gas Field, La., to Lake Sand Field, La.

• **Southern Union Gas Co.**—21 miles, 20-in., planned, Albuquerque, N. M.

Southern Union Gas Co.—30 miles, 12-



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20-in., contracted, San Juan County, New Mexico. R. H. Fulton & Co.

• **Southwest Gas Corp., Ltd.**—26 miles, proposed, from P.G.&E. line to Victorville, Calif.

• **Texas Eastern Transmission Corp.**—315 miles, 24-in., proposed, Provident City Tex., to Castor, La.

• **Texas Gas Transmission Corp.**—408 miles, 26-in., under way, looping from Bastrop, La., to Jefferson Town Station near Louisville, Ky. Houston Contr. and H. C. Price Co. Spring 1953.

• **Texas-Ohio Gas Co.**—1,435 miles, 30-in., proposed, Hidalgo County, Texas, through Arkansas, Mississippi, Tennessee, and Kentucky on to Spencer, W. Va. Completion date 6-30-53.

• **Union Oil Co. of California.**—40 miles, 8-10-in., planned, San Joaquin Valley and Los Angeles basin.

• **United Fuel Gas Co.**—50 miles, 20-24-in., proposed, Wood County to Lanham, W. Va.

• **United Gas Pipe Line Co.**—44 miles, 20-in., planned, Lirette field to Harvey, La.

• **Utah Natural Gas Co.**—96 miles, 16-18-in., proposed, Clear Creek field near Price to Salt Lake City, Utah.

18-in., Clear Creek to Provo, Utah.

16-in., Provo to Salt Lake, Utah.

Virginia Natural Gas Co.—153 miles Buckingham to Richmond and Portsmouth, Va.

Warren Petroleum Co.—78 miles, 2-24-in., proposed, Lovington, N. M. Completion date 9-53.

Westcoast Transmission Co., Ltd. — (See foreign natural gas pipe lines).

Western Kentucky Gas Co.—2 to 4-in. under way, additions to present system; Modern Welding Co., Inc., contractor.

• **Wilcox Trend Pipe Line Co.** (Harry Bass Drlg. Co.)—157 miles, various up to 20-in., planned, gathering system for delivery to proposed Texas Eastern terminal at Provident City, Tex. (60 miles laterals.)

Foreign Crude-Oil Pipe Lines

Basrah Petroleum Co.—72 miles, 24-in., under way, Zubair to Fao. Completion date May 1953.

• **Cia. de Petroleo Ganso Azul, Ltd.**—48 miles, 4-in., planned, Ganzo Azul field to Pucalpa on upper Ucayali River, Peru.

Creole Petroleum Corp.—143 miles, 26-in., under way, Ule (State of Zulia) to Amuay (State of Falcon). Williams Bros. de Venezuela, S. A., contractor of overland sections. general superintendent, Maracaibo. McWilliams, Gahagan, and Anderson Brothers, contractors of water crossings. Completion date March 1953.

• **Creole Petroleum Corp.**—25 miles, 34-in., planned, Lagunillas to La Salina (State of Zulia). Completion date April 1953.

Direccion General de Yacimientos Petroliferos Fiscales.—409 miles, under way, Plaza Huincul to Bahia Blanca, Argentina.

Interprovincial Pipe Line Co.—135 miles, 24-in., looping from Regina to U. S. Border. Anderson-International Contractors, Ltd.

• **National Iranian Oil Co.**—38 miles, 12-in., planned, Lali to Masjid-i-Sulaiman.

27 miles, 12-in., planned, Kut-Abdullah to Zergan.

• **Petroleos Mexicanos.**—145 miles, 12-in., considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

100 miles, planned, Isthmus of Tehuantepec, Jose Colomo to El Plan field, Minatitlan.

72 miles, 12-in., proposed, Poza Rica to Atzacapotzalco, Mexico.

Petroleos Mexicanos.—125 miles, 10-in., under way, Jose Colomo to El Plan.

• **Saskatoon Pipe Line, Ltd.** — 56 miles, 6-in., planned, Milden to Saskatoon, Sask.

Texas Petroleum Co.—60 miles, 4-6-in., under way, Pta. Nino to La Dorada.

Trans Mountain Oil Pipeline Co.—711 miles, 24-in., under way, Edmonton, Alta., to Vancouver, B. C. Canadian Bechtel, Ltd., engineers. Completion date 8-53.

Edmonton to Acheson, Canadian Pipe Line Const. 8-53.

Acheson to Blue River, B. C., Comstock Midwestern. 8-53.

Blue River, B. C., to Coquehalla, B. C.; Mannix, Ltd. 8-53.

Coquehalla to Vancouver, B. C., Comstock Midwestern. 8-53.

• **Yacimientos Petroliferos Fiscales Bolivianos.**—170 miles, 4-in., planned, Bermejo to Tupiza, Bolivia.

Foreign Products Pipe Lines

Colombian Ministry of Petroleum.—115 miles, 4-in., begin 1953, La Dorada to Cartago, Colombia, Williams Bros. Engineers.

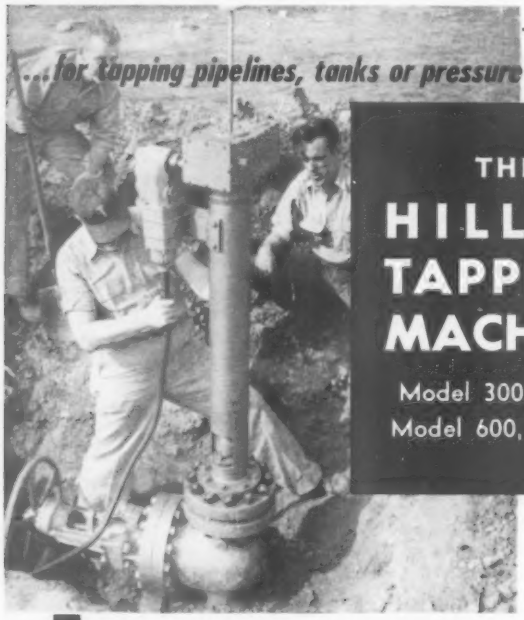
93 miles, 8-in., begin 1953, Cantimplora to Dorada, Colombia, Williams Bros. Constructors.

• **Empresa Nacional del Petroleo**—80 miles, 6⅝-in., planned, Concon to Santiago, Chile.

Empresa de Ferrocarriles Ecuatorianos.—50 miles, 6-in., contracted, Guayaquil to Palmira, Ecuador. J. A. Jones, contractor; C.R.C. Engineering Co., engineers.

• **Governments of Southern Rhodesia and Portuguese East Africa.**—200 miles, considered, Beria, Portuguese Mozambique to Umtali, Southern Rhodesia.

Societe des Petroles au Congo. (Sub Cie. Financiere Belge des Petroles, S.A.). — 225



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- the number of individual E Bonds sold in 1951 totaled 63,069,000 pieces—8% more than in 1950.
- purchases of $25 and $50 E Bonds—the denominations popular with Payroll Savers—were greater than the sales of $500 and $1,000 E Bonds.
- monthly redemptions of unmatured E Bonds during each of 9 months (April to December, 1951) were less than 1% of the amounts outstanding.
- the *cash value* of Series E Bonds held by individuals on December 31, 1951, amounted to $34,727,000,000—$4.3 billions more than the cash value of Series E's outstanding in August, 1945.

That Americans have built personal security and a reservoir of purchasing power exceeding $34.7 billions is due in no small measure to the patriotism and foresight of men like Mr. Taylor and other leaders of industry who have made the Payroll Savings Plan available to their employees.

For help with your Payroll Savings Plan, phone, wire or write to Savings Bond Division, U.S. Treasury Department, Suite 700, Washington Building, Washington, D. C.

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THE OIL AND GAS JOURNAL
TULSA 1, OKLAHOMA

How's This For Picking 'Em Up and Laying 'Em Down!

(Quoted from an unsolicited letter)

Unibolt Couplings. About a year and a half ago I purchased three miles of 2-inch line pipe to be used as a water line. This line has to be taken up and moved from location to location so I decided to equip this pipe with your Unibolt Couplings.

A three-man pipe line crew will "couple up" three miles of this line in an eight-hour working day, providing the country is not unusually rough. Two men make up the coupling and start the nut on the bolt while the third man follows up using a long handled speed wrench to set up the coupling nut. A crew of four men, two working from each end of the line, will uncouple the three miles in 3-1/2 hours. These men run the nuts on the bolts all the way, making them finger tight so they will not be lost on the next move. There is practically no upkeep on this line, requiring but a few bolts and gaskets once in a while. Three men recently laid 7,000 feet of this line in three hours and four men took up the same amount in one hour.

In using the screw-end pipe it took five men, using three sets of pipe tongs, to make the pipe line crew, and doing some repair work such as cutting new threads, knocking "dutchmen" out of the collars, etc., took three days to lay three miles of pipe. They had to carry in their car three sets of pipe tongs, pipe cutoffs, stock and dies, hammer, chisel, diamond point, a 36" and a 24" pipe wrench, large oil can, pipe thread dope, and extra 2" collars. Using the pipe equipped with Unibolt Couplings required them to carry only a light ball pein hammer and two light long-handled speed wrenches

Unibolt Malleable Couplings are ideal for water lines, tank batteries, fuel lines, and similar low pressure service. They are easy to assemble, inexpensive, and require practically no upkeep. A replaceable, long-life, resilient seat ring assures a tight seat even after frequent dismantling, rough handling, and on misaligned pipe.

These Couplings are also furnished with a tongue and groove type seat which, of course, provides a stiff joint and will not permit coupling of misaligned pipe.

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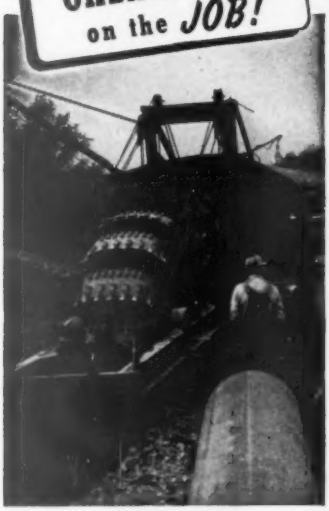

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miles, 6-in., under way, Ango-Ango to Leopoldville, Belgian Congo. Completion date 2-53.

Imperial Oil, Ltd.—64 miles, 12-in., under way, Sarnia to London, Ontario. Comstock Midwestern, Ltd.

• **Petroleos Mexicanos.**—124 miles, 6-in., planned, Lagos to Guadalajara, Mexico.

54 miles, 6-in., planned, Lagos to Aguascalientes, Mexico.

82 miles, 8-in., planned, Salamanca to Lagos, Mexico.

Societe des Transports Petroliers par Pipe Line.—160 miles, 10-in., under way, Le Havre to Paris, France. Entrepose, contractor. Completion date 1953.

Foreign Natural-Gas Pipe Lines

• **Azienda Generale Italiana Petroli.**—110 miles, 12-14-16-in. Start 11-52. Cortemaggiore to Genoa. Completion date 11-53.

Azienda Generale Italiana Petroli—90 miles, 12-in., under way, Cortemaggiore to Bologna, Italy, SNAM crews.

120 miles, 16-in., under way, Cremona Porto Mar to Ghera, Italy, Montubi, contractor.

40 miles, 12-in., under way, Ripalta-Bergamo, Italy.

Direccion General del Gas del Estado.—310 miles, 8-in., under way, Plaza Huincul to Neuquen, Argentina, to the vicinity of General Conesa, Argentina.

• **Empresa Nacional del Petroleo**—80 miles, 10¾-in., planned, Concon to Santiago, Chile.

• **Northwest Natural Gas Co.**—950 miles 24-in., planned, Alberta fields to Vancouver B. C., Seattle, Wash., and Portland, Ore.

Petroleos Mexicanos.—205 miles, 16-in., under way, Monterrey to Torreon, Mexico.

• **Petroleos Mexicanos.**—440 miles, 20-in., planned, Brazil to Tampico to Poza Rica, Mexico.

• **Trans-Canada Pipe Lines, Ltd.** (Canadian Delhi Oil Co.)—2,247 miles, 14 to 30-in., proposed, Alberta to Toronto to Montreal.

747 miles, 8 to 24-in. gathering system in Alberta.

• **Westcoast Transmission Co., Ltd.**—1,110 miles, 24-in., planned, Dawson Creek, B. C. through Pine Pass and Fraser River Valley to Kamloops, Princeton, and Vancouver to Portland. Ford, Bacon & Davis, engineers.

280 miles, 20-in., planned, Pincher Creek to Montana on to Spokane, Wash. Ford, Bacon & Davis, engineers.

138 miles, 20-in., planned, Sumas to Tacoma, Wash.

139 miles, 18-in., planned, Tacoma, Wash. to Portland, Ore.

• **Western Pipe Lines.**—833 miles, 24-in. proposed, from southern Alberta, eastward across the Canadian prairies, serving principal towns and cities along the route to a point near the International boundary.

Structural Steel Allocated

WASHINGTON. — The Defense Production Administration has given the Petroleum Administration for Defense 72,000 tons of structural steel for second-quarter use of the oil and gas industry.

The allotment is 7,425 tons under the third quarter 1952 allocation but is 13,200 tons over the amount to be available for the current quarter. The bulk of the steel, DPA said, is for new refinery construction, particularly aviation-gasoline facilities, and oil-field equipment.

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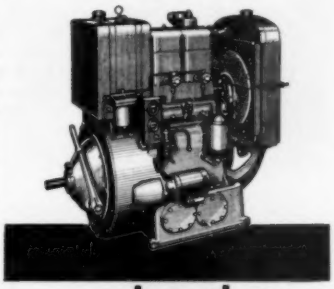

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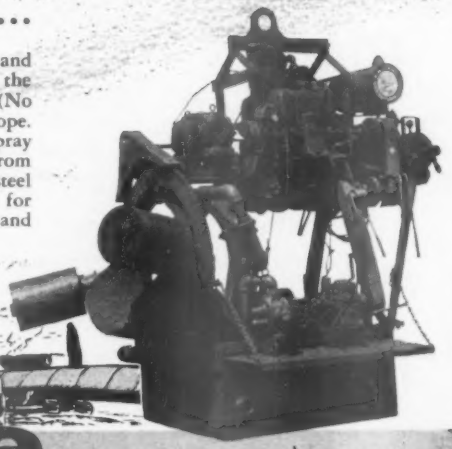

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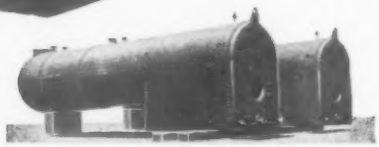

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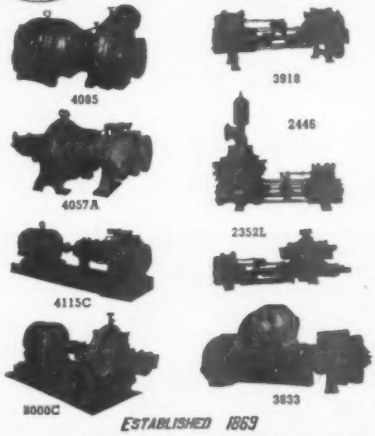

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PIPE LINES

California Companies Seek Increased Gas Deliveries

LOS ANGELES.—Southern California Gas Co. and Southern Counties Gas Co. plan a further expansion of their part of the natural-gas pipe-line system to Texas to bring in another 150,000,000 cu. ft. of gas daily.

If approved by the Federal Power Commission, the project would increase capacity of this system to 705,000,000 cu. ft. daily and bring total cost of the California portion to about $40,000,000.

To handle the additional 150,000,000 cu. ft., the two companies plan to lay 73 miles of 30-in. loop line and install three compressor units. The new construction would cost $7,500,000 and be completed in about a year.

The companies now are laying about 20 miles of loop to expand capacity about 150,000,000 cu. ft. daily. This is set for completion this spring.

FPC Action May Bring More Hearings on Texas-Ohio Line

WASHINGTON. — The Federal Power Commission has partially reopened the proceedings on Texas-Ohio Gas Co.'s proposed 1,400-mile natural-gas-transmission line from the Mexican border to Hidalgo County, Texas, to Lancaster, Ohio.

The commission rejected Texas-Ohio's application November 7 on grounds that the company failed to show that the operation of the $185,000,000 line "is required by present or future public convenience and necessity."

FPC's reopening move came in the form of an order designating its November 7 verdict as a tentative decision instead of a final action. It gave the interested parties 20 days to file exceptions.

Texas-Ohio proposes to sell all of its gas to Reserve Natural Gas Co., a newly formed corporation at the Ohio terminus. A major share (232,000,000 cu. ft.) of the estimated 512,000,000 cu. ft. daily of gas required for the line would be supplied under a contract with Petroleos Mexicanos, the Mexican oil agency, from fields in Mexico. The remainder would come 173,000,000 cu. ft. daily from natural-gasoline plants and 107,000,000 cu. ft. from gas fields in Texas.

Pressure has been exerted on the commission by several groups recently to reconsider its rejection of the Texas-Ohio application. The Public Utilities Commission of Ohio said recently that the FPC order was "arbitrary and unreasonable" or in error in 47 different ways. FPC, the Ohio group said, did not consider Ohio's 5-year critical shortage of natural gas which had made necessary 12 emergency orders. It also charged that FPC violated its own rules and regulations as well as the National Procedure Act that that it was wrong in demanding that the company prove it had "absolutely adequate supplies," pointing out that no gas company serving Ohio has had adequate supplies for 5 years. The state agency said the shortage already had increased the cost of constructing new homes.

Colorado Commission to Act On Sterling Crude Branch

DENVER.—The Colorado Public Utilities Commission is slated to act this month on an application by R. A. Goodall, Ogallala, Neb., producer, to lay a 45-mile, 6-in. crude line from Little Beaver and Middlemist fields in Washington and Adams counties, Colorado, to a connection at Merino, Colo., with the Sterling Pipe Line System.

The proposed line would have a capacity of 15,000 bbl. daily. Construction is planned for the coming summer *(The Oil and Gas Journal, December 15, 1952, page 171)*.

The Sterling system, under construction by Toronto Pipe Line Co., runs from Merino, Colo., to Gurley, Neb., where it connects with the recently completed Platte crude line from Worland, Wyo., to Wood River, Ill.

The Sterling line is scheduled to be completed this month.

New York State Natural to Lay 64 Miles of New Lines

PITTSBURGH.—New York State Natural Gas Corp. plans to spend $3,380,000 this year on pipe-line construction to bolster its gas supply in this New York area.

The company will add about 64 miles of new lines to its system. Near the New York state line, it will lay about 20 miles of 20-in. line from Sabinsville to Boom Station at a cost of $1,136,000.

Other projects involve laying about 18 miles of 20-in. line from the company's Iroquois connection in New

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York to a point about 5 miles north of Pavilion, N. Y., at a cost of about $1,068,000; 5 miles of 20-in. loop line north of the Ithaca, N. Y., station, $291,000; and 21.5 miles of 14-in. line in the Therm City to Auburn, N. Y., vicinity, $885,000.

In its year-end report, New York State Natural said major projects completed during 1952 include the laying of 19 miles of 20-in. between Cayuta Gate and Ithaca Station at a cost of $1,126,800, and construction of about 50 miles of 16-in. from Utica to Amsterdam at a cost of $2,639,000.

DPA Approves Accelerated Amortization for New Lines

WASHINGTON.—The Defense Production Administration has announced that Plains Pipe Line Co., Newcastle, Wyo., will be permitted fast tax write-off of 40 per cent of $128,415 and 25 per cent of $952,224 to be spent for a new crude line in Ector and Midland counties, Texas.

DPA also approved accelerated amortization of 25 per cent of $467,200 for a 27-mile, 10-in. natural-gas line in Lea and Eddy counties, New Mexico, being laid by Southern Union Gas Co.; 25 per cent of $62,000 for a pipe line planned by Phillips Petroleum Co. in Moore and Potter counties, Texas.

Peoples Maps Gas Pipe-Line Construction Slate for '53.

PITTSBURGH, Pa. — Peoples Natural Gas Co. is planning several natural-gas pipe-line-construction projects in 1953 to bolster its system in Pennsylvania.

The company will replace 13.5 miles of 6-in. line from Girty to Indiana, Pa., with 8-in. at a cost of $340,000; lay about 8 miles of 12-in. from Carnot to Bunker Hill, $305,000; parallel 3 miles of 10-in. with 20-in. from Beatty to Derry, $169,000; lay 6 miles of 10-in. from the Colonial Village area near Clairton to the old Allegheny County Airport vicinity, $210,000; and lay 7 miles of 10-in. and one mile of 8-in. in the Zelienople area.

Mountain Fuel Supply Places New Station in Operation

SALT LAKE CITY.—Mountain Fuel Supply Co. has hiked its natural-gas deliveries to the Salt Lake City area by 12,000,000 cu. ft. daily through completion and operation of a new $750,000 compressor station on the main line 15 miles east of Lyman, Wyo.

See Composite and Refinery Catalogs, or Write for Folder On

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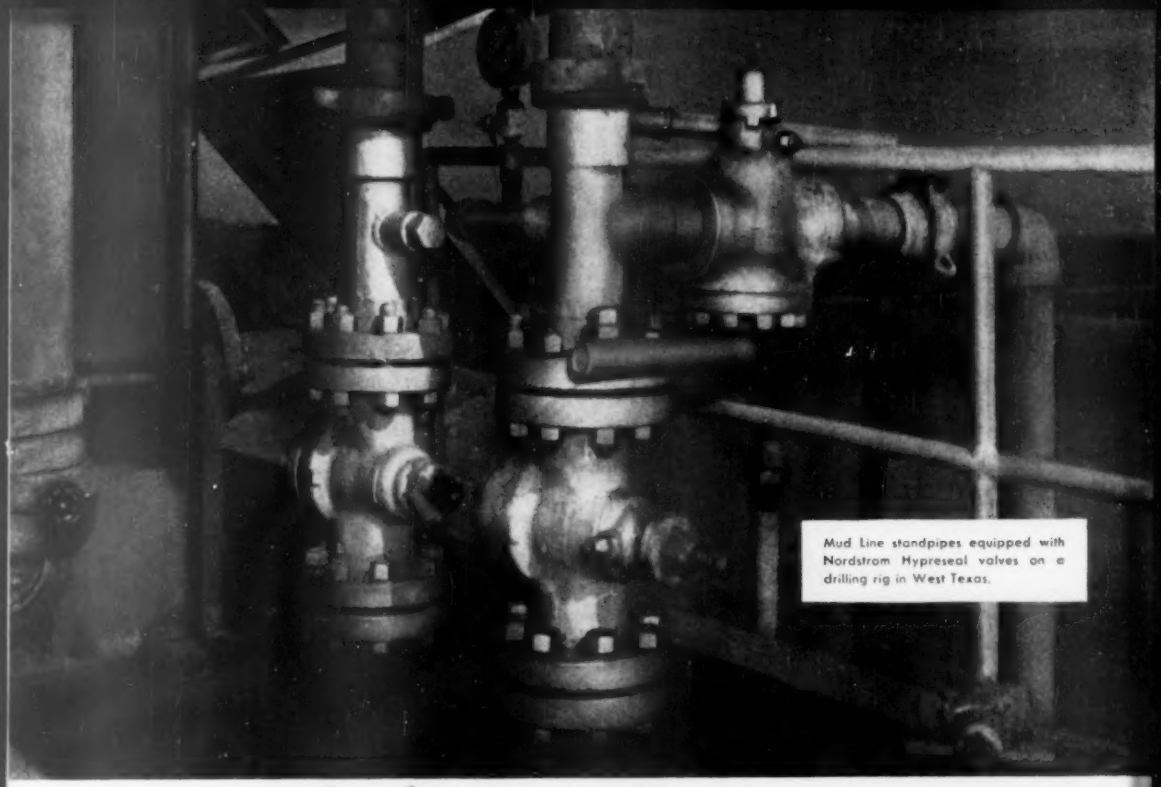

Mud Line standpipes equipped with Nordstrom Hypreseal valves on a drilling rig in West Texas.

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Most valves wear out very quickly when they handle erosive drilling mud at high pressures. Why do Nordstroms last so much longer?

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2. **Protected by a film of lubricant, the valve seat is never exposed to the line fluid.**

3. **There are no pockets or recesses in which sediment can collect.**

4. **Nordstrom Hypreseal valves with Nordcoseal lubricants are especially designed for high pressures such as those found in mud line service.**

If a valve had any one of these advantages, it would outlast the average valve in mudline service . . . but . . . Nordstrom Hypreseal Mud Line valves—designed expressly for tough drilling services—embody *all* of these features.

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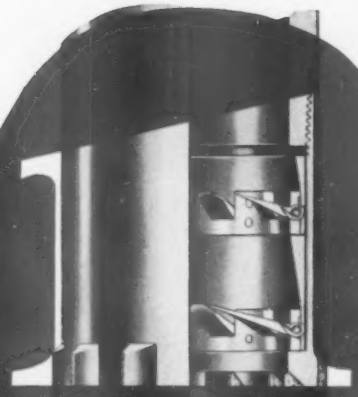

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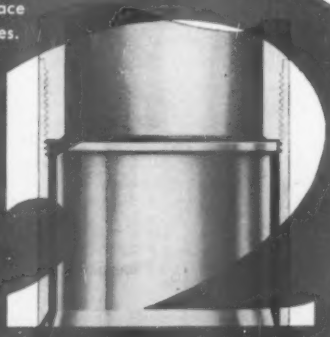
With large, exposed pole shoe completely magnetized across lower surface and beveled edges.



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Among the Drilling Contractors

Pike to Run New Rig At Santa Fe Springs

Thomas P. Pike Drilling Co., Los Angeles, has acquired a new Emsco 800 rotary rig, which now is being set up in the Santa Fe Springs field. Its first hole will be a well to be drilled under contract for Walker & Pray at 2 Gauldin Community. It will be under the supervision of Harold Sease, recently made tool pusher after many years service with the contractor as a driller.

Pike now has 15 rigs running in California. Three new operations are under way, including the Walker & Pray well at Santa Fe Springs; Shell Oil Co. 8 Grazide in the Brea Canyon area, with Walt Allen as tool pusher; and The Texas Co. 17-A Honor Rancho, in the Castaic area, with Curtis Adams as tool pusher.

Peel Tools Drill New Kansas Discovery Well

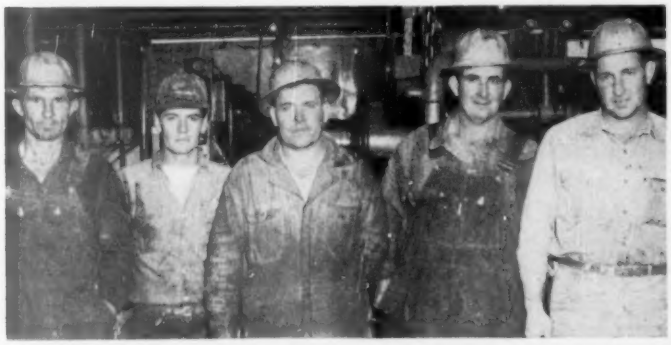
Glenn Peel, Hoisington, Kans., has another addition to the list of discovery wells he has drilled. He was the rotary contractor on the new indicated wildcat oil-producer which West-Pan Hydrocarbon Co. of Amarillo, Tex., is completing in northwestern Sheridan County, western Kansas. The well, 1 Wessell, located in the SW NW NW 27-6s-29w, 14 miles from the nearest other production, is virtually assured of opening a new field by the recovery of more than 570 ft. of clean oil in a drill-stem test at 4,005-28 ft. in Lansing-Kansas City lime. Peel's tools carried the hole to 4,720 ft. in Arbuckle lime and ran casing. Cable tools are being used to complete the well.

Joe Reaves, Cushing, Okla., is drilling for **Arrow Drilling Co.,** Tulsa, at a wildcat location, 1 Holland, a mile northeast of Glencoe, in northern Payne County. Hole is projected to 3,400 ft.

Arrow Drilling Co., Tulsa and Dallas, is starting an 8,800-ft. test for Sohio Petroleum Co. at a wildcat location 2 miles southwest of Bernice, Union Parish, Louisiana. Location is for 1 Lindsay, C SW SW 16-21n-3w. Other new jobs taken by this contractor include a 6,800-ft. wildcat for Cities Service Oil Co. at 1 Bounds, 2½ miles southwest of Wortham, Limestone County, East Texas.

Denman Drilling Co., Wichita Falls, Tex., has moved a rig to Navajo County, Arizona, where it has the contract for a test which The Texas Co., Sinclair Oil & Gas Co., and Skelly Oil Co., as joint operators, will drill on their Hoskinni unit at 1-A Navajo, NE NW NW 12-41n-18e.

Kern & Trimble Drilling Co., Magnolia, Ark., is starting another test in the new West Fouke field, Miller County, southwestern Arkansas, where it is drilling for Murray Petroleum Co. of Texarkana, Ark. The new operation, 1 Wiegel, NW SE NW 21-17s-27w, is a west offset to the discovery



Drilling crew on a heavy rotary rig which Rowan Drilling Co., Fort Worth, has under contract to Skelly Oil Co. on a wildcat test 2 miles west of the Townsend field, in Lea County, New Mexico. Left to right: Roy Morgan, H. L. Briggs, E. N. Dowell, R. H. Pounds, and W. E. Hooper (driller).

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well, and the second confirmation attempt. The north offset to the discovery well failed. Production of the discovery, and so far only producer, is from the Paluxy sand around 4,300 ft. The new test is contracted to 4,500 ft.

Carter-Jones Drilling Co., Kilgore, Tex., has the contract for a 5,300-ft. wildcat test being drilled by E. L. Howard 6½ miles northeast of Sulphur Springs, Hopkins County, East Texas. Name of the test is 1 Voss.

Llano Drilling Co., Midland, Tex., is drilling for Fullerton Oil Co. at 1-F University, a 10,000-ft. wildcat test 14 miles south of Andrews, in 17-13-University Lands Survey, Andrews County, West Texas.

Mendenhall Drilling Co., Emporia, Kans., is the contractor on a rank wildcat test which Raymond Gear is drilling at 1 Cummings, SW SW SE 2-24s-7e, 12 miles northeast of El Dorado, in northeastern Butler County, Kansas. Location is more than 14 miles from nearest production.

Aggas Drilling Co., Morris, Okla., has a rig under contract to J. R. Porter and associates of Oklahoma City for a wildcat test in northwestern Pawnee County, Oklahoma. The new operation, now drilling, is at 1 Gilchrist. Location, in the SW SW SE 5-22n-4e, is 7 miles northwest of Pawnee.

Schafer Drilling Co., Oklahoma City, has moved a rig to a wildcat location in the Lovell area of northwestern Logan County, Oklahoma, where it will drill a 6,200-ft. Wilcox sand test for Johnson & Gill and Brooks-Scanlon Oil Co. The test is known as 1 Byrd. Spot location is in the SE SW NE 20-18n-4w.

ACTIVE ROTARY RIGS*
(United States and Western Canada)

Area—	Week ended 1-5-53	Change week ended 12-29-52	Change week ended 1-7-52
Gulf Coast	633	−16	− 5
N. & W. Tex.-N. M.	809	0	−247
Ark.-N. La.-E. Tex.	139	− 7	− 53
Oklahoma	342	0	+ 9
Kansas-S. Nebraska	159	−13	− 6
Illinois-Eastern	115	− 2	+ 38
Rocky Mountains	231	+17	+ 58
Pacific Coast	180	+ 1	+ 1
Total U. S.	2,608	−20	−205
Western Canada	167	− 6	+ 7
Total	2,775	−26	−198

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the North and West Texas-New Mexico and Oklahoma-Kansas areas are shown on pages 172 and 173.

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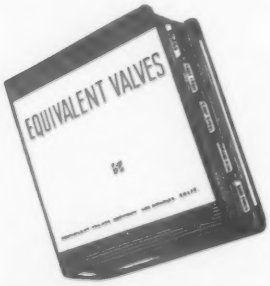

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REFINING

Malco Refineries Acquires Bloomfield, N. M., Refinery

ROSWELL, N. M.—Malco Refineries, Inc., has purchased a small 200-bbl. topping plant at Bloomfield, N. M., from Aerex Co., Bloomfield.

The sale was effective December 1, according to A. C. Kittrell, president and general manager of Aerex. Purchase price was not disclosed.

Malco currently is engaged in constructing a larger plant on the same site. The company operates a 2,500-bbl. refinery at Roswell with thermal cracking capacity totaling 1,750 bbl. It also owns a 1,500-bbl. refinery at Leuders, Tex., which was acquired from Petroleum Products Refining & Producing Co., in 1951. Thermal cracking facilities can process a total of 500 bbl. daily.

Cal Standard Reports '52 Expansion Costs $30,000,000

SAN FRANCISCO.—T. S. Petersen, president of Standard Oil Co. of California, said last week his firm had completed or begun construction of six major projects of a $30,000,000 refinery-expansion program during 1952.

Emphasis in new construction was heavy on the petrochemical end. The principal projects, Petersen said, were:

...A $10,000,000 benzene plant now nearing completion at El Segundo which also will produce toluene and aviation-gasoline components. Output will go into the manufacture of phenol and detergents.

...A $4,000,000 phenol plant, first such plant in the West, now under construction at Standard's Richmond refinery and scheduled for completion this year. Feed stock will come from the benzene plant, and output will go into production of plywood adhesives, resins, dyestuffs, and insecticides.

...$1,500,000 addition to the detergent alkane plant and a major expansion of the paraxylene plant, completed at the Richmond refinery early in the year. Production will go into the manufacture of soaps and synthetic textiles, respectively.

...$1,000,000 continuous acid-treating plant completed at Richmond in June. The new unit can treat 4,500 bbl. of feed stock daily for production of lubricating oils.

...$900,000 phthalic anhydride plant scheduled for completion at Richmond in March. The chemical is a constituent of paints, lacquers, and plastics.

Not included in the 1952 expansion outlay is $20,000,000 set aside for the imminent construction of a 36,000-bbl. catalytic cracking unit at El Segundo. Work on the cracker will be completed next year.

Anderson-Prichard Formally Takes Control of Kanotex

ARKANSAS CITY, Kans.—Anderson - Prichard Oil Corp., Oklahoma City, formally took over management and operation last week of the 13,000-bbl. refinery here previously owned by Kanotex Refining Co. *(The Oil and Gas Journal, December 22, page 365).*

Officials of both companies were present for the transfer of Kanotex stock. Roland V. Rodman, president of Anderson - Prichard, announced that Fred A. Deering, vice president in charge of refining for Kanotex when the sale was made, will be general manager of the refinery.

Rodman said Anderson - Prichard plans to make the plant at Arkansas City its biggest single operation. Plans call for the immediate launching of

New Deer Park Unit

It took about 2½ hours to erect this 135-ton benzene - concentration column at Shell Oil Co.'s Deer Park refinery near Houston. It is part of the aromatic section of the Platforming unit. The column is 155 ft. long and 9½ ft. in diameter. It was constructed in Dallas by Foster Wheeler Corp. and brought to Deer Park on three flat cars.

Fit Tenite plastic pipe with a saw, slip-sleeve joints, cement and brush

Fitting and laying tough Tenite plastic pipe is quick and easy. For example, the pipe is sawed to size, solvent cement is applied to the pipe ends and a thinner to the slip-sleeve coupling; the two ends are then forced into the slip-sleeve coupling to form the joint. In a typical installation, three men easily laid 4000 feet of 4" Tenite pipe in a day; usually eight men are required to lay the same amount of steel pipe.

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the first phase of an expansion program which will boost the plant's capacity soon to 15,000 bbl. daily and ultimately to 20,000 bbl. daily.

In addition to the refinery, Anderson-Prichard acquires connections with the product lines of Great Lakes Pipe Line Co., access to crude supplies in Kansas, Oklahoma, and West Texas, and production of about 400 bbl. daily.

Mid-Continent Expanding Facilities of Tulsa Refinery

WASHINGTON. — Mid - Continent Petroleum Corp. has been granted a certificate by the Defense Production Administration approving accelerated amortization of 65 per cent of $536,015 for new and expanded refining facilities at the company's West Tulsa, Okla., refinery.

G. E. Wynn, vice president in charge of manufacturing for Mid-Continent, said construction already is under way on a new 10,000-bbl. cracked-gasoline debutanizer under the certificate. A new furnace and other additions to the catalytic cracker will raise its capacity to about 21,000 bbl. daily from 16,000 bbl. daily.

The construction is scheduled for completion next spring.

California Oil to Erect 10,000-Bbl. Platformer

WASHINGTON. — California Oil Co. of Perth Amboy, N. J., has been granted a certificate of necessity by the Defense Production Administration granting accelerated amortization on an investment of $9,300,000.

The major portion of this sum will be for a 10,000-bbl. per day Platforming unit, to be built at the 60,000-bbl. refinery operated by California Refining Co. The grant also covers the cost of revamping other, existing units at the plant.

Bureau of Mines Publishes New Diesel-Fuel Survey

WASHINGTON. — The Bureau of Mines has released its third annual survey of diesel fuels produced in United States refineries. This 1952 report, Report of Investigations No. 4935, was prepared in cooperation with the motor-fuels survey panel of the American Petroleum Institute's Automotive Research Committee.

The report compiles results of A.S.T.M. tests run on a total of 285 samples taken throughout the country. Included are fuels manufactured by 46 refiners in 106 refineries, large and small.

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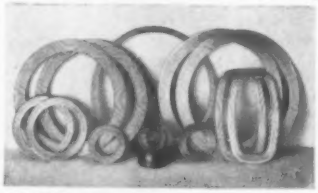

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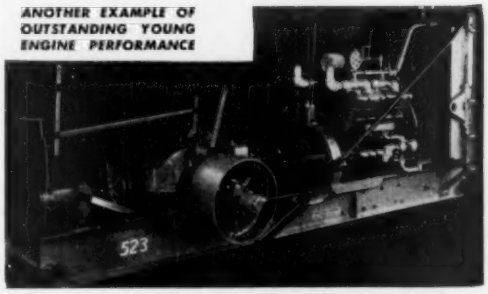

THIS ENGINE BROKE CABLE TOOL DEPTH RECORD

A Model 250-RB Young Drilling Engine is furnishing power for a deep test well in New York State. The 275 H.P., 8 cylinder Young Engine being used by New York State Natural Gas Company is now drilling near 11,000 feet—the world's deepest cable tool well. This equipment is suitable for 12,000 feet or deeper.

The Young Reversible Transmission features easy operation with Rugged Cone Clutches and Automatic Brake on Pulley Shaft. Young Drilling Engines range in size from 110 H.P. in Gas, Gasoline and Diesel Models. For complete information write for Bulletin #50 J.

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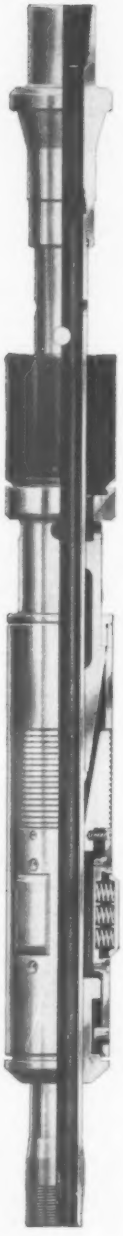

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NATURAL GAS

Case Argued

Important decision near in Northern Natural hearing

WASHINGTON.—Oral arguments were begun here last week in the Federal Power Commission's investigation of the transfer and sale by Northern Natural Gas Co., Omaha, of all its gas-producing properties and leases to Northern Natural Gas Producing Co., a recently formed, wholly owned subsidiary.

The intermediate-decision procedure was ordered omitted by the commission so that the case could be decided directly, without an intermediate decision by a presiding examiner.

The decision is expected to have far-reaching effects *(The Oil and Gas Journal, November 3, page 172)*. It is generally conceded that Northern Natural formed the new subsidiary to remove its producing properties from FPC jurisdiction. The matter came to a head when FPC ruled that Northern for rate-fixing purposes must figure its own gas at a price calculated to yield 6 per cent return on the depreciated original cost of the reserves. This means, in some cases, that Northern's own gas is valued in Hugoton field of Kansas by FPC at 2.5 or 3.5 cents per M.c.f., while gas from nearby wells is sold—to Northern or some other purchaser—at 8 cents or more.

The commission issued an order on June 24 and amended it on October 28 which authorized Northern to boost capacity of its pipe-line system from 600,000,000 cu. ft. daily to 825,000,000 cu. ft. daily. It contained a condition requiring that the company could not, without prior FPC approval, sell or transfer its reserves as long as the gas could be economically produced therefrom for rendering the service authorized in the order.

On November 5, Northern notified FPC that it had sold all of the leases and wells it owned as of October 31. The commission then called a hearing to determine if the terms of its amended June 24 order had been violated. Hearings commenced November 20 and ended November 24.

Brea Chemicals to Operate New Ammonia Plant at Brea

LOS ANGELES.—Brea Chemicals, Inc., has made arrangements to lease and operate a $13,000,000 plant at Brea, Calif., in Orange County to manufacture ammonia from natural gas.

Homer Reed, president of Brea Chemicals, said the plant will be financed by Amoniaco Corp. on a 30-acre site west of the $8,000,000 petroleum-research center opened last year by Union Oil Co. of California, parent firm of Brea Chemicals.

Construction contractor is C. F. Braun & Co. The new plant is scheduled for completion during the summer of 1954. Natural gas will come from wells near Brea.

New York State Natural to Continue Storage Expansion

PITTSBURGH.—New York State Natural Gas Corp. plans to spend about $7,774,000 this year in improving and expanding its facilities.

About $3,380,000 will be spent for new pipe lines in the New York area (see Pipe Lines in this issue). The remaining approximate $4,394,000 will go for development of new production and underground-storage facilities.

One of the most active firms in the drive for more underground-storage capacity, New York State Natural reports substantial progress in its 1952 development program. The company said in its year-end report that gas stored in its underground reservoirs had been increased from a total of 36.5 billion cubic feet in October 1951 to almost 56 billion cubic feet last October—almost 20 billion cubic feet in 1 year. The company estimates that gas in storage by October of this year will be increased to about 65.4 billion cubic feet.

New York State Natural completed two major storage projects last year. They were the $9,000,000 South Bend storage pool and station near South Bend, Pa., and the $2,842,000 Sabinsville pool and station at Sabinsville, Pa., near the New York state line.

The company said work on the world's largest storage pool at Oakford near Delmont, Pa., is expected to continue into 1954. The pool is being developed jointly by New York State Natural and Texas Eastern Transmission Corp.

From January through November last year, New York State Natural said it drilled 34 wells in its effort to find new local sources of gas supply. It completed 24 of these as producers with a combined open-flow potential of about 117,368,000 cu. ft. daily.

The company said it sold about 71 billion cubic feet of gas last year and expects a daily peak demand during the current heating season of about 861,000,000 cu. ft.

Peoples' Plans Expansion Expenditure of $8,000,000

PITTSBURGH, Pa.—Peoples Natural Gas Co. said last week it will spend about $8,000,000 this year for expansion.

The company spent about $10,000,000 last year adding to its system. Part of the money went for increased underground storage. The company's system currently numbers nine pools. By the first of November 1952, gas in storage totaled more than 13 billion cubic feet.

Natural Gasoline

Panoma Corp. Asks Approval Of L.P.G. Storage Project

AUSTIN.—Panoma Corp. has requested permission of the Texas Railroad Commission to store L.P.G. underground in Carson County, Texas.

The company plans to drill two storage wells—one for butane and one for propane. Each would store about 35,000 gal. of product.

The cavities would be washed out of a salt section which Panoma expects to top at around 1,858 ft. The salt is topped and underlain by anhydrite, the company said. Fresh water would be used to leach out the cavities to a depth of about 1,988 ft. Panoma would store the brine in a 1-acre surface pit.

Panoma recently completed installation of new equipment at its Carson County natural-gasoline plant, boosting its product output to 125,000 gal. daily from 85,000 gal. daily *(The Oil and Gas Journal, November 17, 1952, page 442)*.

The commission also approved two applications for permission to store L.P.G. underground. The applications were submitted by Reef Fields Gasoline Corp. and Barnhart Hydrocarbon Corp.

Reef Fields plans to store L.P.G. in three cavities washed out in a salt section at 1,350 ft. in East Vealmoor field of Howard County, where the company now is completing construction of a new natural gasoline plant *(The Oil and Gas Journal, December 15, page 168)*. Barnhart will store products through two wells to be drilled in Barnhart field of Reagan County. Storage will be in a salt section reported to be 1,000 ft. thick at 1,100 ft.

Things you never see on a seismic report:

Behind each National Seismic Report there is a story of hard work, difficulties, skill and downright doggedness which never shows on the survey, but definitely adds to the *quality* of the survey. National has the perfect combination of SKILL . . . EXPERIENCE . . . TECHNIQUE . . . EQUIPMENT and INSTRUMENTS to produce a survey that you know is accurate and dependable!

Exploration and Drilling

New-Oil Areas

LAST year saw an increase in remaining-reserve estimates of crude oil and lease condensate despite withdrawals of nearly 2.3 billion barrels of oil. By far the bulk of the yet-to-be-established increase in reserves was found in the same areas that accounted for most of the production.

Of the newer areas contributing to the increase, the Williston basin was outstanding. However, even here, as with all new areas, initial reserve estimates will be conservative because of the lack of production history—only a small portion of the more than 2.3 billion barrels of oil added during 1952 to the estimated ultimate recovery of the United States will come from the Williston basin.

In North Dakota only the Madison on the Nesson anticline can be considered as having proved reserves of significance. At the end of the year about 22,000 acres at 5,000 bbl. per acre seemed reasonably assured with double that volume of recoverable oil estimated for current pools when fully developed. In the eastern Montana portion of the basin, wildcat drilling has found oil throughout an enormous area, but successful drilling has been slow. Here again the figures credited through 1952 will not begin to reflect the reserves that additional drilling is expected to develop.

Another relatively new area of exploratory and development drilling was northern Lea County, New Mexico. This area featured an astoundingly high success ratio: Out of 141 wildcats drilled, 47 were completed as oil discoveries and 2 as gas discoveries. Nearly half of the discoveries were made in pre-Permian rocks. Of highest interest was the Devonian, but the structural gyrations and inverted ice-cream-cone structures of the Devonian rocks in this area make it impossible to assign reserves beyond producing wells at this time.

The "demise" of the Spraberry was the biggest feature of West Texas activity during 1952, but the decline in enthusiasm for this area only served to increase enthusiasm for other areas, as demonstrated by nearly 170 discoveries, about half of which were in Pennsylvanian rocks. Recent discoveries off the east side of the Central Basin platform have not been followed by sufficient development drilling for this area to be given more than a token reserve compared to what the future is expected to bring.

Apparently California had the best year since Cuyama Valley was opened in 1948-1949. The discovery of Oakridge and a deeper pool at Torrey Canyon in Ventura County, the Miocene fractured-shale discovery at Buena Vista Hills on the west side of San Joaquin Valley, and the Eocene pool off the south flank of Wheeler Ridge field give credence to statements that California is not through. All of these discoveries are expected to have excellent growth potentialities.

Outlook for 1953

It looks as though during 1953 the bands are going to be playing in (1) the Williston basin, (2) northern Lea County and on south into the Delaware basin, which had a little encouragement in 1952 and may come into its own this year, (3) the Midland basin near the Central Basin platform, (4) the northern portion of the Anadarko basin, (5) here and there throughout the Central Rocky Mountain area, and (6) the Gulf Coast area east from Mississippi.

The first five of these areas are considered as offering rather definite possibilities for a continued search for significant reserves through the years, but 1953 is considered a critical year for the southeastern states.

Stirred out of lethargy by the discovery of light oil in substantial quantities in southwestern Alabama, this area has seen considerable geophysical exploration work from southwestern Alabama to the Florida Keys. This activity is beginning to take the form of drilling wildcats. Just one good smell of oil and this area will swing into action in a big way. On the other hand, some feel that a year of dry holes may drive the area back toward its status 15 months ago when just about everyone had given up hope for the near future.

This is an area of potentially enormous oil fields, and 1953 may be the year that decides whether the area is to begin blooming now or will have to wait another 10 years.

Philip C. Ingalls.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

COLORADO . . . Carter Oil Co.'s 1 Olson, NW NE NE 9-7n-93w, South Lay Creek, Moffat County wildcat, made gas on drill-stem test of the interval 8,625-90 ft. in the Mesaverde.

UTAH . . . Glen M. Ruby's 1 Unit, SE NW NW 11-26s-19e, wildcat in the Big Flat area, Grand County, is reported to have made oil on drill-stem test of the basal Paradox section. The well is reported to have flowed 5 bbl. of oil per hour.

OKLAHOMA . . . The Wilcox sand is proved as the most promising of several possible pay zones logged at MacMillan Petroleum Corp., Blackwood & Nichols et al 1 Krout, NE NW SW 14-15n-4w, Logan County. On drill-stem test from 6,440-80 ft. in second Wilcox sand oil flowed at an estimated rate of 20 to 25 bbl. per hour.

WEST TEXAS . . . Texas Gulf Production Co. 1 Headlee, Ector County wildcat, tested 46 and 22 bbl. of oil on hourly flows through 1 and ¼-in. chokes, from the Ellenburger at 13,106-270 ft. Later the well gaged 49 bbl. of oil in 1 hour through ⅝-in. choke from 13,106-225 ft.

Texas Gulf Coast

New Discovery Appears Certain For Calhoun

HOUSTON.—On Matagorda Island at Panther Point, Salt Dome Oil Corp. and Western Natural Gas Co. have an apparent new discovery at their 1 State Tract "D" wildcat in Calhoun County. Possible new producer was drilled to total depth of 10,560 ft. with 9⅝-in. production string set to 6,480 ft. Operators set plug at 6,600 ft. and tested open hole 6,480-600 ft. which revealed an undetermined amount of gas and distillate. There were no details released. Company encountered fishing job around 7,005 ft. where about 700 ft. of drill pipe was lost and had to be recovered. But hole was plugged back to 5,370 ft. and drilling then commenced in sidetracked hole, which was bottomed at present total depth of 10,560 ft.

In Brazoria County 7 miles west of Angleton and ¾ mile northwest of Bailey's Prairie field, Greenbrier Oil Co., of Fort Worth, has opened an apparent new oil reservoir at 1 H. C. Munson. Operator is continuing to test after gaging the discovery for 16 hours on ⅛-in. choke at the rate of 10 bbl. of 36.7°-gravity oil per hour. Flow was measured under gas-oil ratio of 1,075-1 with pressure on tubing of 1,900 psi. After perforating 11,162-69 ft., well flowed gas in 45 minutes and oil in 1 hour. Well is bottomed at total depth of 11,481 ft., with 5½-in. production string cemented at 11,275 ft. and packer set at 11,122 ft. Plug back depth is 11,176 ft. The deep wildcat test was spudded last September and was delayed with two fishing jobs. Hole was sidetracked at 10,771 ft. and drilled to 11,481 ft. in sidetracked hole. Sidewall cores indicated gas shows at 10,818-820, 10,821 and 10,918 ft. with oil shows at 10,940 and 10,948 ft. Location is on the Samuel Carter Survey, A-53.

Meanwhile off the east flank of Bryan Mound in Brazoria County, 3½ miles south of Velasco, Greenbrier Oil Co.'s 1 W. J. Bryan has been plugged and abandoned at total depth of 7,523 ft. Tool plugged on attempt to run drill-stem test through perforations at 5,908-20 ft. and operator re-ran testing tool. With 1,000 ft. of water cushion, tool open 2 hours and 10 minutes, well flowed water cushion to surface in 21 minutes, salt water in 1 hour with flowing pressure of 640 psi. and shut-in pressure 720 psi. Retainer was set at 5,910 ft. and 24 perforations shot at 5,904-07 ft. Test on that interval with tool open 6 hours and 10 minutes, gave recovery of 23 dry stands, 10 stands of water cushion, 4 stands mud and 24 stands of salt water. Bottom-hole flowing pressure was 1,750 psi. and shut-in pressure 2,250 psi Testing was through perforations in 7⅝-in. casing cemented at 6,522 ft. Failure lies on the J. Brougham Survey, A-164.

Location for a 5,800-ft. wildcat test 1 mile south of South Deckers Prairie, Segment "A" field production in Harris County has been announced by A. W. Head, J. L. Welsh, Jr., and N. H. McCord of Houston. The south extension try will be drilled as 1 Arthur Brautigam on the Wm. Hobby Survey, A-344, 6 miles southwest of Tomball.

Between Deckers Prairie and Tomball fields in Montgomery County, Columbia Drilling Co. has cemented production string in 1 Wm. Holderrieth et al southeast outpost of the South Deckers Prairie field. Operator cored through a sand with no recovery and drilled to total depth of 5,779 ft. and cemented 5½-in. casing at 5,646 ft. Well is ¾ mile southeast of Deckers Prairie field and ¾ mile northwest of Tomball field production. Location is on the John H. Edwards Survey, A-13.

TEXAS GULF COAST (DISTRICTS 2 & 3) SUCCESSFUL WILDCATS

Goliad County: W. C. McBride, Inc. 1 O. G. Dreier, J. T. Kilgore Sur., A-172, TD 4,060 ft., 45,000,000 cu. ft. of gas per day open flow, Frio sand.

TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

Bee County: Henderson Coquat et al 1 D. N. Hamilton Est., W. V. Ragley Subd., dry, TD 9,024 ft.

Spartan Drilling Co. 1 Tipps, Charles Clark Sur., A-135, dry, TD 8,359 ft.

Brazoria County: E. Cockrell, Jr. 1 M. B. Chilton et al, Austin & Williams Sur., dry, TD 4,764 ft.

Greenbrier Oil Co. 1 W. J. Bryan, J. Brougham Sur., dry, TD 7,523 ft.

The Texas Co. 1 Ramsey State Farm, Stephen F. Austin Lge., dry, TD 10,116 ft.

U. S. Oil Co. of Texas 1 A. T. Morris, Johnson, Borden & Walker Sur., dry, TD 10,220 ft.

Colorado County: Henry L. Seale 1 Preston K. Shatto, John Moyer Sur., A-642, dry, TD 2,750 ft.

DeWitt County: Dudley T. Dougherty et al 1 Bluntzer heirs, John McCrabb Sur., dry, TD 7,980 ft.

Liberty County: General Crude Oil Co. 1-B Bert W. Colby, Juliana Malley Sur., dry, TD 9,553 ft.

Gulf Oil Corp. 1 Fannie Worrall et al, Wm. Harris Sur., A-51, dry, TD 9,520 ft.

Live Oak County: Heep Oil Corp. et al 1 Wm. A. Harlan et al, L. A. Fant Sur., dry, TD 7,520 ft.

Live Oak County: Russell, Trull & Thompson 1 Alvin W. Steinmeyer, Refugio Co. School Land Grant, dry, TD 4,774 ft.

Newton County: Lenoir M. Josey, Inc. 1 White & West, R. Goodwin Sur., dry, TD 8,520 ft.

San Jacinto County: Continental Oil Co. & Carlton D. Speed, Jr., 1 Frost Lumber Co., J. Fernandez de Romayor Sur., dry, TD 13,078 ft.

Victoria County: Forest Oil Corp. et al 1 August L. Miller, Victoria 4 League Grant, dry, TD 5,412 ft.

Eastern Texas

New Wildcats Spotted In Cherokee County

DALLAS.—Cherokee County received three wildcat locations, one projected to 6,000 ft. and the others to 5,000 ft.

L. A. Grelling 1 E. C. Ragsdale, deepest of the three, was located on a 72-acre tract in the Jose Pineda Survey, A-40, 2 miles west of Jacksonville. Bill R. Tipton 1 Reynolds estate was located on a 50-acre lease in the J. M. Doherty Survey, A-344, 6 miles southwest of Jacksonville, and Tipton 1 E. W. Meador estate will be drilled in the G. M. Doherty Survey, A-244, some 7 miles southwest of Jacksonville.

Cass County had a new location at W. L. Pickens, Dallas independent, 1 Horace Hillard. The proposed 7,000-ft. wildcat was located in the O. S. Haygood Survey, 4 miles north of Douglasville.

Pryor Dillard, San Antonio, was reported planning a series of 800-ft. tests 2 miles north of the old Corsicana field in Navarro County.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES

Kaufman County: E. B. Fletcher 1 Marion Reed, Bledsoe Butler Sur., 5 miles N Kemp, dry, TD 5,110 ft.

Leon County: Hassie Hunt Trust 1-A E. F. Swift Est., Ramon de la Garza Sur., A-8, 4 miles SW Kickapoo, dry, TD 7,601 ft., Austin chalk 6,298 ft.

Navarro County: Intex Oil Co. 1 J. A. Penney, Wm. Bright Sur., 1 mile N Eureka, dry, TD 3,307 ft.

Mississippi

High Gravity Production Opened in Baxterville

JACKSON.—In Baxterville field, Lamar County, Mississippi, Gulf Refining Co. has established high gravity oil production from the Lower Cretaceous at 25 Andrews, Section 6-1n-16w. On potential test this well flowed at the rate of 135 bbl. of 40.9°-gravity oil per day through ¾-in. choke with tubing pressure 100 to 200 psi. Flow was cut with only 4.10 per cent b.s. and w. Completion was from perforations 10,821-841 ft. opposite tight sand of probably lower Washita-Fredericksburg age. It will be recalled that this well was drilled to 13,431 ft. when pipe was stuck. Hole was plugged back and sidetracked at 9,700 ft. Sidetracked hole was drilled to total depth of 10,880 ft. and 5½-in. casing was run to bottom. The zone from which 25 Andrews is completed was cored and drill stem tested in original hole. Log of this section shows very little spontaneous potential and it is doubtful that this zone would have been tested if it had not been cored. On completion test on ¼-in. choke, tubing pressure was reported from 100 to 200 psi. With this decline it seems doubtful that any extensive development of this deeper production will take place very soon.

In the Rodney area of Jefferson County, Mississippi, casing is to be run in the B. Serio-W. C. Proctor 1 Kate S. Logan, Section 8-10n-1w. This test, located approximately 6,000 ft. northeast of the field discovery well, was drilled to total depth of 9,627 ft. with top of Lower Cretaceous being picked at 9,616 ft. from cores. Top of Tuscaloosa Massive sand was picked at 9,561 ft. in cores. A total of 9½ ft. of gas sand and 13 ft. of oil sand was reported in cores of this zone. Another 4 ft. was reported as having shows of oil, but is thought to be an oil to water transition zone. A drill-stem test was run at 9,571-76 ft. using ¼-in. chokes and 1,530 ft. water cushion. Tool was left open 15 minutes with top pressure reaching 6 psi. at end of test. When pipe was being pulled the well unloaded oil and gas. It is reported that from increased weight of pipe after the test, it was established that 22 bbl. of oil was produced on the test. Bottom-hole pressure was 3,900 psi. flowing and 4,075 psi. shut-in.

In Monroe County, Mississippi, approximately 6 miles northeast of Muldon field, Shell Oil Co. is testing gas and salt water from 1 Mrs. Lee Harrington, Section 25-14s-6e. This test was drilled to total depth of 6,122 ft. in Knox dolomite, then plugged back and 7-in. casing was set at 3,505 ft. Cement was drilled out to 3,545 ft. and tubing was run on packer at 3,404 ft. It is reported that the well flowed 800 to 1,500

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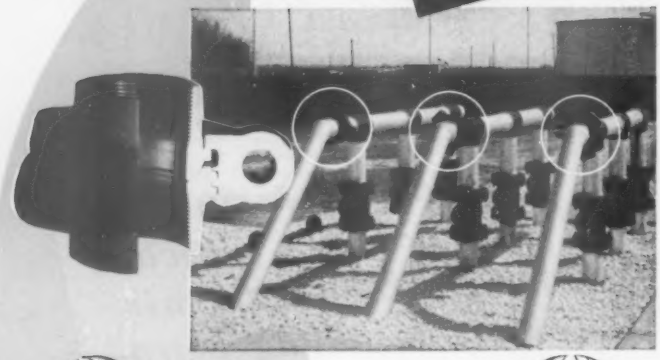

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MISSISSIPPI WILDCAT FAILURES

Clarke County: A. M. Keisker-C. A. Perkins 1 Masonite Corp., Sec. 29-1n-15e, dry, TD 5,010 ft.

Hancock County: Sun Oil Co. 2 Weston Lumber Co., Sec. 6-8s-15w, dry, TD 12,417 ft.

ALABAMA WILDCAT FAILURES

Conecuh County: E. D. Scruggs-L. Cashion Co. 1 T. E. McMillan, Sec. 26-5n-11e, dry, TD 4,810 ft.

Sumter County: E. B. LaRue 1 Mrs. B. A. Jenkins et al, Sec. 7-20n-3w, dry, TD 3,048 ft.

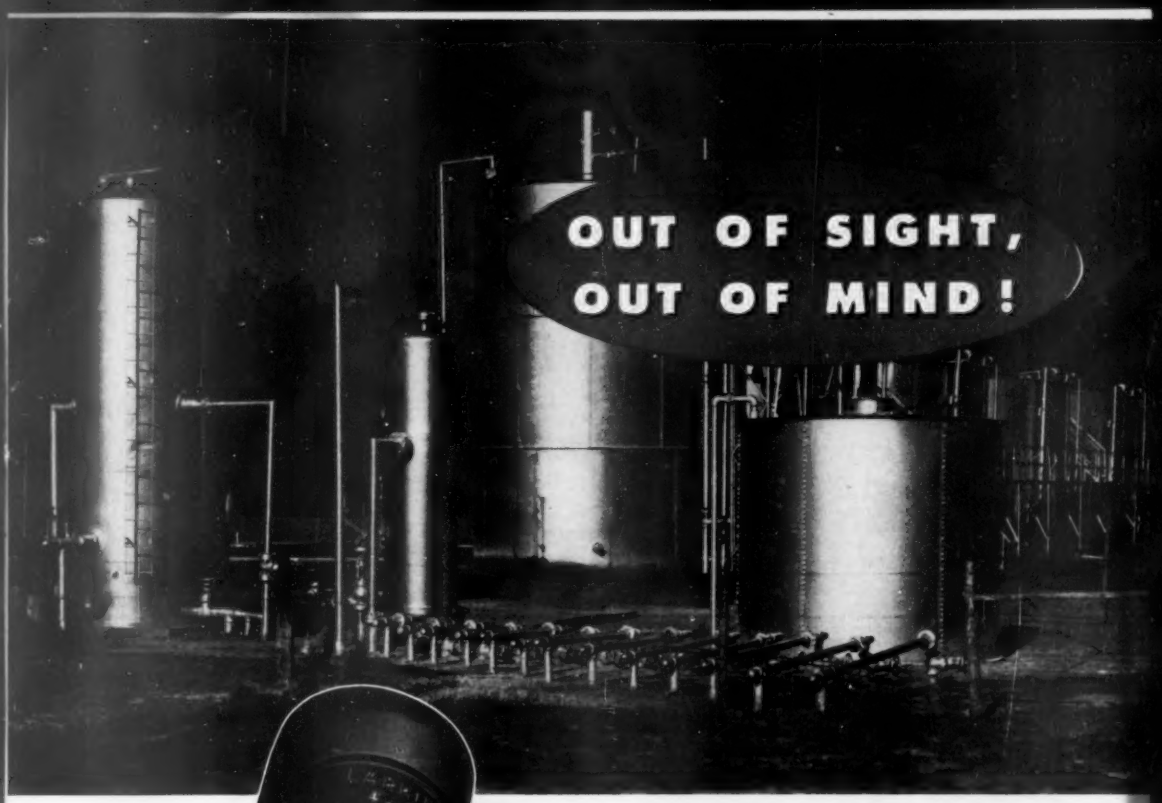
Southwest Texas

Effective Test Run At Hidalgo County Wildcat

CORPUS CHRISTI — Two and one-half miles northeast of Tabasco, George H. Coates of San Antonio has run effective drill-stem test at his 1 David Chapa, wildcat in Hidalgo County. Operators have run several drill-stem tests on the well and are as follows: section 6,016-26 ft., employing ¼-in. chokes, developed 400 psi. working pressure with recovery being ½ gal. distillate with bottom-hole pressure of 1,380 to 2,860 psi., test on section 6,774-88 ft. and using ¼-in. chokes and 1,500 ft. of water cushion, well developed 190 psi. working pressure with recovery of 200 ft. of distillate and bottom-hole pressure 1,225-2,115 psi. and the last test was on section 6,868-75 ft., using ¼-in. chokes and 1,500-ft. of water cushion, well flowed under 200 psi. working pressure and water cushion in 9 minutes and then was shut-in for 14 minutes and built up to 700 psi. with recovery being 900 ft. of water cushion and 110 ft. mud and dirt colored distillate and bottom-hole pressure flowing was 2,650 psi. and shut-in pressure was 4,340 psi. Houston Oil and American Republics 3 West, located 4,080 ft. south-southeast, is producing from the 6,860 ft. level which is probably the "O" sand.

Seven miles north of Harlingen, Gulf Coast Leaseholds, Inc., have announced intention to drill their 1 W. R. Schussler et al, wildcat, in Cameron County. New venture will be drilled to proposed total depth of 11,000 ft. This will be a very highly important test because of present time there are no active tests being drilled in this county at all. The drilling will commence when permit is granted. Drill site is on the Ojo de Agua Grant, Block 6.

W. Earl Rowe, operating out of San Antonio, has drill-stem tested 1 Baker Est.-Dougherty, wildcat, in McMullen County and recovered approximately 30 ft. of distillate. Drill-stem test taken at 7,393-7,401 ft. section using ¼-in. choke under 1,500 ft. water cushion made the recovery. Tool was open 30 minutes, and test started surfacing water cushion in 12 minutes, gas appeared in 23 minutes. Test developed 1,450 psi. working pressure, and bottom-hole pressure 2,330 psi., shut-in pressure 3,320 psi. Drill-stem test of 7,406-411 ft. interval employing ¼-in. choke, 1,500 ft. of water cushion, for 23-minute test. Well flowed under 1,575 psi. working pressure, and started flowing water cushion in 9 minutes, gas in 23 minutes, re-



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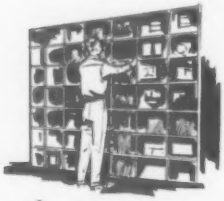

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covery being 15 ft. of distillate and 225 ft. muddy water cushion with bottom-hole flowing pressure 2,820 psi., bottom-hole shut-in pressure 3,280 psi.

O. W. Killam has abandoned the 1 Amalia S. Scott, confirmation in Duval County, approximately 3½ miles southeast of Realitos. Sam Cunningham field-Cole sand confirmation was cored in 4,185-4,260 ft. section and recovered nothing of commercial value. Log was run to 4,319 ft. with bottom of hole called at 5,210 ft. Location is on Jose Marcelo Hinojosa Grant.

Paisano Trading Co. plan to drill a test 137 ft. east of the Quin Drilling Co. 1 Lucas, dry hole in Goliad County. New venture will be drilled to a proposed total depth of 6,000 ft. and will be known as the 1 B. M. Lucas. Quin drilled their dry hole to total depth of 5,550 ft. and abandoned at that depth. New venture is located on the W. P. Miller Survey, A-193.

SOUTHWEST TEXAS (DISTRICT 1 & 4) SUCCESSFUL WILDCATS

Jim Hogg County: Sinclair Oil & Gas Co. 3 Aurora G. Gallagher, Rafael de la Pena Sur., A-254, TD 4,495 ft., 7,750,000 cu. ft. of gas per day, dry gas, Gallagher sand.

Nueces County: Phillips Petroleum Co. 2 "Call" St. Tr. 689, Nueces Bay St. Sub. Lds. Tr. 689, TD 7,250 ft., 117.76 bbl. of oil per day on ⅛-in. choke, 36.5°-gravity oil, gas-oil ratio 574-1.

San Patricio County: Lockhart Oil Co. of Texas 1 J. R. Marmion, Day Land & Cattle Co., A-389, TD 6,500 ft., 7,700,000 cu. ft. of gas per day on absolute open flow, 71.9°-gravity oil, 79 bbl. of oil per day, Marmion sand.

SOUTHWEST TEXAS (DISTRICT 1 & 4) WILDCAT FAILURES

Atascosa County: Oil Producers 1-A C. M. Rice, John Gaston Survey, A-283, dry, TD 3,732 ft.

Bastrop County: Lucy Joyner 1 Mattie Murchison et al, Addison Litton Survey, dry, TD 1,935 ft.

Brooks County: The Texas Co. 1 M. Longoria, Jose Manuel Chapa & Luciana Chapa Sur., dry, TD 8,100 ft.

Duval County: C. Neathery, Jr. 1 Jas. P. Luby, SGI Co. Survey, A-934 dry, TD 4,652 ft.

Pontiac Refining Co. 1 John T. Dinn, T&NO RR Co. 142, A-1859, dry, TD 3,510 ft.

Frio County: Robert K. Taylor 1 R. B. Lowe, BS&F Sur., Sec. A-21, dry, TD 925 ft.

Jim Wells County: Barron Kidd 1 W. & C. Friedrich, J. Poitevent Sur., dry, TD 4,950 ft.

San Patricio County: Kirkwood & Co., J. A. Morgan, Louis H. Haring, Jr., 1 U. E. Ray, Geo. H. Paul S/D, dry, TD 7,515 ft.

Starr County: Hawn Bros. 2 M. P. de Gutierrez, Sur. 24, Share 14, dry, TD 1,052 ft.

Webb County: G. G. Mortimer, Jr. et al 2 R. E. Welhausen et al, CCSD&RGNG Sur., dry, TD 2,730 ft.

Willacy County: Humble Oil & Refining Co. T-1 Sauz Ranch-Jardin Z "T," San Juan de Carricito Grant, dry, TD 7,600 ft.

Williamson County: Martin B. Semands 1 S. R. Ging, P. J. Wyche Sur., dry, TD 1,004 ft.

Wilson County: Rowan & Hope & E. W. Gill 1 L. H. Mitchell, Karnes Co. School Lands Sur., dry, TD 5,761 ft.

Louisiana-Ark.

Monroe Field Well Has Smackover Possibilities

SHREVEPORT.—The American Republics Corp. has indications of commercial production from the Smackover lime in the old Monroe gas field, Union Parish, at their 1 Olin-Interstate-American Republics fee, Section 20-21n-3e, on the west side of the Monroe chalk rock gas reservoir. The indicated Smackover discovery is 33 miles southeast of the nearest Smackover pay. The 1-well Randolph field is the nearest producer, located in Section 29-23n-3w. A 30-minute drill-stem test recovered about 770 ft. of 36°-gravity oil, 3,000 ft. of water cushion, and 500 ft. of gas-cut mud.

Barnett Serio et al has completed 1 Learned for a new oil discovery in Concordia Parish. The discovery, located in the area about 5 miles north of Vidalia, flowed 132 bbl. of oil per day from the Wilcox. Name of the new field is Rifle Point.

Arkansas.—Kirby Petroleum Co. perforated 2,076-82 ft. and is now swabbing to test the Nacatoch sand at 1-B Southern Co., in Section 18-16s-14w, west well in new Calion field, Union County.

W. G. Skelly has filed official potential on 1 Dickson heirs, Section 36-19s-27w, discovery of Dodridge field, southeastern Miller County. Producing from Pettit lime perforations at 6,828-40 ft., well flowed at the rate of 132 bbl. of oil per day.

LOUISIANA SUCCESSFUL WILDCAT

Concordia Parish: Barnett Serio et al 1 Learned, 17-8n-10e, flowed 132 bbl. of oil per day from Wilcox 4,031-35 ft., TD 6,024 ft. (opens Rifle Point pool).

LOUISIANA WILDCAT FAILURES

Bossier Parish: W. A. Patterson et al 1 Tooke,

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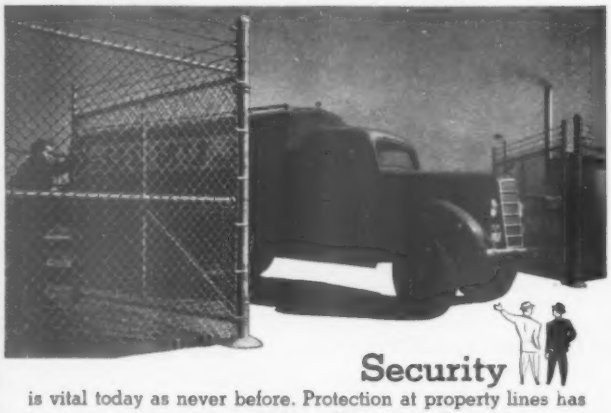

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C SW NW NW 12-16n-11w, dry, TD 2,750 ft.

Concordia Parish: Barnett Serio and Justiss-Mears 1 Turner-Pasternack, 23-8n-10e, dry, TD 6,921 ft.

Wilhite, Seay & Bryans 1 Winston, 42-7n-9e, dry, TD 6,504 ft.

Richard W. Norton et al 1 Madison O & D Co., C SW SE 24-6n-7e, dry, TD 6,520 ft.

De Soto Parish: R. W. Norton, Jr. 1 Lowery Est., 4-12n-13w, dry, TD 3,135 ft.

Winn Parish: R. A. Campbell et al 3 Urania Lumber Co. "C," 5-10n-1e, dry, TD 3,350 ft.

ARKANSAS WILDCAT FAILURES

Calhoun County: Jack Carnes 1 Robertson, C SW NE 2-14s-16w, dry, TD 3,001 ft.

Cross County: Cross Oil Co. 1 Smith, C SW SW SW 21-9n-4e, dry, TD 2,873 ft.

Permian Basin

South Extension Due At New Triple N Field

MIDLAND.—The new Triple N Ellenburger field of southern Andrews County had prospects of a ½-mile south extension, and a high well on the Ellenburger, at Gulf Oil Corp. 1-AQ State.

Top of the Ellenburger at 12,421 ft., minus 9,239 ft. was reported 67 ft. high to the company's 1-MMM University, ½-mile north. Drill-stem test open 4 hours and 35 minutes between 12,400-60 ft. had gas in 8 minutes and oil in 30 minutes, then flowed 325 bbl. of 47°-gravity oil in 4 hours. Oil in the drill stem was reversed out, with no shows of formation water. Following the test, operators cored saturated dolomite to 12,480 ft., and were drilling ahead from that point.

Shell Oil Co. 1-A-1 University, Ellenburger strike southeast of Andrews, flowed 718 bbl. of oil in 24 hours through 16/64-in. choke from perfortions at 12,540-60 and 12,571-87 ft., then gaged 527 bbl. of oil in 17 hours through 12/64-in. choke. Operators continued testing.

In Ector County, Texas Gulf Production Co. 1 Headlee had been delayed by a fishing job that developed while pulling pipe after drill-stem testing at 13,106-66 ft., in the Ellenburger. Recovery from the test was around 23 bbl. of 52°-gravity oil, with no formation water. It was to drill deeper.

In Tom Green County, Taylor Oil & Gas Co. 3 George Foster Rust had prospects of discovery production in Canyon limestone. After acidizing perforations at 4,527-32 ft., swabbing kicked the well off to flow at an estimate rate of 5 bbl. an hour into pits. When turned into tanks, it gaged around 7 bbl. hourly. The flow died about once an hour, according to reports, but returned after one trip of the swab.

Phillips Petroleum Co. 1 Ratliff, northeast Ector County semi-wildcat and prospective Wolfcamp extension, had flowing oil in 66 minutes on a drill-stem test from 8,635-90 ft. After cleaning, the well gaged 27 bbl. of 41°-gravity oil in 1 hour.

In northeast Borden County, Bill Roden and Associates 1 Belew was flowing from 6-7 bbl. of oil an hour from perforations at 8,362-66 ft. in the Ellenburger.

Continental Oil Co. 28-A Shannon, west extension to Elkhorn Ellenburger field of Crockett County, gaged 56 bbl. of oil in 1 hour on a drill-stem test from 7,277-7,407 ft. Recovery in drill pipe included 540 ft. of sulfur water. It was drilling ahead.

In Schleicher County, Sinclair Oil & Gas Co. 1-101 University had prospects of Ellenburger production. Drill-stem test from 7,970-8,045 ft., total depth, developed some oil and gas-cut mud before the tool plugged. Second test recovered 7,100 ft. of 39°-gravity oil with no water. Top of the Ellenburger by samples was 7,782 ft., minus 5,272 ft., or slightly high to Bobby Manziel 1-53 University, Ellenburger failure 1½ miles to the northeast.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Andrews County: Phillips Petroleum Co. 1 University JJ, 18-10-University, TD 12,340 ft., elev. 3,264 ft., PB 4,685 ft., pay 4,620 ft., IP pumped 108 bbl. 31°-gravity oil.

Dawson County: Cities Production Co. 1-B Leverett, 3-4-D. L. Cunningham Sur., TD 11,900 ft., elev. 3,067 ft., PB 7,740 ft., pay 7,690 ft., IP 154 bbl. 38°-gravity oil, ¼-in. choke, TP 50 psi., GOR 100 cu. ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Andrews County: Ralph Lowe 1-K David Fasken, 43-41-T1N-G&MMB&A, TD 12,016 ft., elev. 3,043 ft., Pennsylvanian 8,780 ft., Mississippian 10,905 ft., Simpson 12,580 ft., Ellenburger 12,976 ft.

Borden County: Husky Oil Co. 1 Higginbotham, 1-32-T3N-T&P, dry, TD 8,165 ft., elev. 2,534 ft., Spraberry 5,800 ft., Dean 7,100 ft.

Howard County: Laughlin-Porter and Texas Crude Co. 1 Sam Fisherman, 10-33-T2N-T&P, dry, TD 8,970 ft., elev. 2,718 ft., Spraberry 6,440 ft., Pennsylvanian 8,895 ft.

Pecos County: Jay H. Floyd 1 T. J. Murphy, M. C. Koonce Sur. 4, dry, TD 9,260 ft., Spraberry 4,972 ft., Ellenburger 9,246 ft.

Humble Oil & Refining Co. 1-K Sawyer Cattle Co. 18-1-T&P, dry, TD 9,911 ft., elev. 2,408 ft., Spraberry 4,774 ft., Ellenburger 9,430 ft.

Reeves County: Hill & Hill 1 Jones, 40-55-PSL, dry, TD 2,889 ft., elev. 3,252 ft., Delaware lime 2,737 ft.

Terry County: Buffalo Oil Co. 1 Ira Goss, 11-D14-C&M, dry, TD 7,555 ft., elev. 3,535 ft., Glorietta 5,870 ft., Tubb sand 7,130 ft.

TEXAS PANHANDLE (DISTRICT 10) WILDCAT FAILURES

Hutchinson County: Gulf Oil Corp. 1 Amarillo National Bank, 6-HC-H&OB, 6 miles NE Stinnett, dry, TD 3,303 ft.

Wheeler County: Sun Oil Co. 1 Martin, 31-A9-H&GN, 5 miles SE Mobeetie, dry, TD 4,140 ft.

SOUTHEAST NEW MEXICO

Skelly Oil Co. 1-R State, Lea County wildcat in 18-16s-35e, had flowing oil in 1 hour and 10 minutes on drill-stem test between packers at 10,687-740 ft. in the upper Pennsylvanian. Turned into tanks, it gaged 88 bbl. of clean oil in 3½ hours.

Humble Oil & Refining Co. 2 Federal-Elliott, 33-15s-34e, prepared to plug back and complete in the Pennsylvanian as a gas-distillate discovery following recovery of mud with no shows on drill-stem test from 13,313-475 ft. Previous tests at 12,886-913 and 13,230-81 ft. developed a good gas flow and distillate yield.

Gulf Oil Corp. 1 Federal-General American, 24-17s-29e, had a fishing job at 12,423 ft., total depth. Sun Oil Co. 1 Harper-Federal developed gas, water blanket and 600 ft. of oil and gas-cut mud on a 2-hour test at 12,670-92 ft.

North-Central Texas

Deeper Sand Pay Added To Mineral Creek Field

WICHITA FALLS.—Shell Oil Co. 3 Quintin Little, W. M. Allen Survey, A-15, added a deeper sand pay to Mineral Creek Strawn field of Grayson County. On production test the well flowed 181 bbl. of oil in 12 hours through 24/64-in. choke from perforations at 5,712-64 ft., and from 5,770-76 ft. Other pay sections are around 3,700 and 5,200 ft.

Humble Oil & Refining Co. 1 Mark Williams, Grayson County deep test, was drilling in shale and sand at 11,673 ft. Location is 3 miles northwest of Sandusky.

Warren Petroleum Corp. 1 Cap Yates opened Ben conglomerate production 4 miles northeast of Vineyard in Jack County. Production test through 1-in choke from open hole at 5,714-5,948 ft., gaged 151 bbl. of 45°-gravity oil a day.

Russell Maguire 1 Annie Avery, wildcat 4 miles northeast of Bartons Chapel, developed some gas and recovered 30 ft. of mud with oil shows on drill-stem test from 4,850-62 ft. It was drilling ahead below 4,993 ft. Maguire 2 Craft, wildcat 4 miles northwest of Cundiff, was drilling below 2,566 ft.

In the new area 6 miles northwest of Cundiff, Maguire 2 Lewis Johnson, confirmation well and north offset to the discovery, had surface casing set and was drilling ahead on a 6,000-ft. contract.

Miami Operating Co. announced location for its 1 Zora Jackson, 7,500-ft. Montague County wildcat 7½ miles southeast of Montague in Block 29, League 11, Calhoun CSL.

Noranda Oil Corp. 1 Bert Rushing, 75-1-H&TC, Fisher County test 3 miles southwest of Round Top field, developed flowing oil on a 70-minute drill-stem test at 5,283-96 ft. Oil reached the top in 50 minutes, but rate of flow was not reported. Recovery in the pipe was oil and oil-cut mud, with no water.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Archer County: L. T. Burns 1-EE L. F. Wilson, Lot 4, Blk. 114, ATNCL, TD 3,795 ft., pay 3,784 ft., IP 729 bbl. 41°-gravity oil, 9/64-in. choke, TP 30 psi., GOR 570 cu. ft.

Brown County: F & R Drilling Co. 1 Joe Weedon, H. J. Kern Sur., TD 1,673 ft., pay 1,663 ft., IP pumped 120 bbl. 46°-gravity oil.

Eastland County: Woodson Oil Co. 1 State Lease, Sec. 4, BS&F Sur., TD 2,783 ft., elev. 1,741 ft., IP 34,000,000 cu. ft. of gas.

Grayson County: Scitz, Comegys & Seitz 1 W. P. Mackey, John Bridges Sur., A-127, TD 3,834 ft., Strawn sand pay 3,827 ft., IP 120 bbl. 30°-gravity oil, 12/64-in. choke, TP 230 psi., GOR 300 cu. ft.

Haskell County: Pan American Production Co. 1 C. P. Livengood, Sec. 8, A. W. Terrell Sur., A-530, reef pay 2,790-96 ft., IP pumped 96 bbl. 37°-gravity oil.

Montague County: Frank Wood Associates 1 Sewell Estate, Sec. 167, Belcher Subd., J. P. Owensby Sur., TD 6,389 ft., conglomerate pay 5,797 ft., IP 93.4 bbl. 36°-gravity oil.

Stephens County: Woodson Oil Co. 1 R. L. Morrison, Sec. 1,209, TE&L Sur., TD 4,205 ft., elev. 1,092 ft., Mississippian 4,184 ft., IP 132.5 bbl. 42°-gravity oil, 14/64-in. choke, TP 500 psi., GOR 275 cu. ft.

Taylor County: Trinity Drilling Co. 1 M. C. Wolfe, Blk. 13, Wm. Bell Sur., TD 4,120 ft., elev. 1,903 ft., pay 3,920 ft., IP 65 bbl. 38°-gravity oil in 8 hours, TP 225 psi., GOR 581 cu. ft.

Young County: Bobby M. Burns 1 D. Wilborn, TE&L Sur., A-930, TD 5,066 ft., pay 5,012 ft., IP 265 bbl. 43°-gravity oil, 12/64-in. choke, TP psi., GOR 640 cu. ft.

G. K. McMackin 2 Lem Groves, Sec. 1,491, TE&L Sur., A-917, TD 970 ft., pay 962 ft., IP pumped 5.2 bbl. 36°-gravity oil.

Cy Perkins 1 Lillie D. Herring, Sec. 168, TE&L Sur., A-415, TD 5,200 ft., pay 4,809 ft., IP 441 bbl. 42°-gravity oil, ⅛-in. choke, TP 400 psi., GOR 600 cu. ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: Archer Drilling & Production Co. 1 C. L. Abercrombie, SPRR Sur., dry, TD 1,446 ft., Gunsight 1,368 ft.

Archer Drilling & Production 1 Kunkle, Blk. 9, Wm. Ainsworth Sur., dry, TD 1,340 ft., Gunsight 1,280 ft.

D-D Drilling Co. 2 O. Calvin, Blk. 1, Sulphur Iron Works Sur., A-443, dry, TD 1,147 ft.

C. E. Morrison 1 Langford, Blk. 148, J. W. Harris Subd., Club Ranch, dry, TD 3,961 ft.

G & S Drilling Co. 1 T. L. Wolf, Blk 4, Clark & Plumb, dry, TD 1,042 ft.

L. E. Trout 1 Mrs. M. A. Garvey, Lot 66, Harris Subd., dry, TD 1,508 ft., Gunsight 1,467 ft.

W. C. Wainwright 1 L. Kinder, Blk. 4, Clark & Plumb, dry, TD 1,203 ft., Gunsight 1,174 ft.

Lewis W. Welch 1-D Abercrombie, Chas. Lydings Sur., A-254, dry, TD 5,629 ft.

Baylor County: Ashland Oil & Refining Co. 1 L. W. Hobert, Sec. 3, H&TC Sur., A-1,240, Blk. 46, dry, TD 5,604 ft., elev. 1,419 ft., Ca3do 5,232 ft., Mississippian 5,580 ft.

Ashland Oil & Refining Co. 1 Portwood, Blk. 4, HT&B Sur., A-861, dry, TD 1,790 ft., Tannehill 1,489 ft.

Coleman County: T. A. Kirk 1 H. O. Newman, Sec. 328, McKinney & Williams Sur., dry, TD 2,375 ft.

James L. White 1 E. W. Gill, 68-9-James Ray Sur., dry, TD 1,101 ft.

Haskell County: Texas Pacific Coal & Oil Co. 1 Maggie Hammonds, Sec. 4, HE&WT Sur., dry, TD 5,875 ft.

Jack County: Perkins & Cullum 3 A. A. Kinder, WCRR Sur., A-907, dry, TD 5,003 ft.

Knox County: Mid-Continent Petroleum Corp. 1 Emmett Partridge, D. G. Burnett Sur. 10, dry, TD 5,855 ft., elev. 1,481 ft., Caddo 5,548 ft., conglomerate 5,764 ft.

Montague County: Russell Maguire 1 Goss, A. S. Bray Sur., A-1,205, dry, TD 5,893 ft.

Wichita County: Wingo Bros. B-5 Mrs. C. J. Simpson, Blk. 33, KWVFL Sur., dry, TD 1,805 ft., Gunsight 1,769 ft.

Wilbarger County: Cox Drilling Co. 1 Douglas Davis, 3-10-H&TC, dry, TD 4,809 ft., reef 4,716 ft.

Wise County: Tekola Drilling Co. 1 Pan American Life Insurance Co., 3-10-Cooke CSL, dry, TD 1,030 ft., elev. 860 ft., Viola 6,793 ft., Simpson 6,835 ft., Ellenburger 6,908 ft.

Young County: C. B. Christie 1 F. M. Cullers, Blk. 19, Young CSL, dry, TD 3,702 ft.

Darden-Moore & Schultz 1 J. W. Sparks, Blk. 232, TE&L, dry, TD 1,055 ft.

Pat Fowler 1 W. V. Scobee, Sec. 201, TE&L, dry, TD 845 ft.

Luke Grace Drilling Co. 1 L. C. Deering, Sec. 1,982, TE&L Sur., dry, TD 4,047 ft.

John J. Moran Trustee 1 Remington, M. Edmonds Sur., A-91, dry, TD 3,665 ft., Caddo 3,585 ft.

South Louisiana

Deep Louisiana Wildcat Reported Abandoned

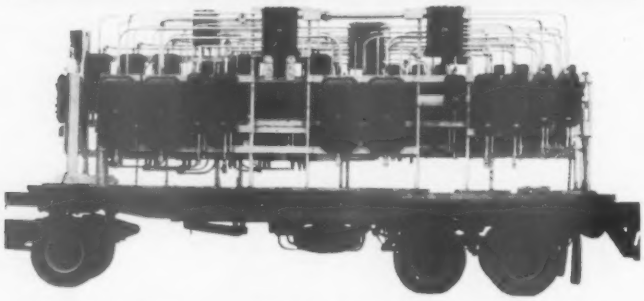
NEW ORLEANS.—H. L. Hunt, Dallas, has filed intention to drill a 9,400 ft. wildcat test in Jefferson Davis Parish, to be known as the 1 Mrs. Florence Avalon Daggett located in Section 15-7s-3w.

Richardson & Bass, New Orleans, have abandoned their deep wildcat test, the 1-E. E. Cockrell St. Lse. 2028, after drilling to total depth of 17,260 ft. After running logs and testing, operators reported only small oil show in the 14,100 ft. section but was not sufficient for commercial purposes. Abandonment ended prospect of Louisiana having deepest production in the United States. This is the second deep test in South Louisiana to be abandoned this year, the other being Magnolia Petroleum's D-1 Ragley Lumber, Section 29-5s-7w, Allen Parish, drilled to total depth of 18,660 ft.

Plaquemines Parish is the scene of 4 California Co. wildcats nearing proposed depths. The 1 State Lease 2127, wildcat, in West Black Bay area, is now at total depth of 10,008 ft. and running log. Proposed depth for the venture is 10,500 ft. The 1 L. T. Haeuser et al, wildcat, Section 30-20s-29e, with proposed depth of 11,000 ft., is now down to 10,932, at latest report. The 1 La Citrus Land, Lease 4, wildcat, Bay Gardene area, with a proposed depth of 11,500 ft., is now drilling 10,390 ft. The 1 State Lease 2,122, wildcat, W. Battledore area with proposed depth of 10,000 ft., is now drilling at 8,757 ft.

Three miles southwest of Eunice, H. L. Hawkins has filed location for the 1 Ora Childs, wildcat, Acadia Parish. Location is in Section 55-7s-1e. Proposed depth will be 9,500 ft.

Union Oil of California has also filed intention to drill the 1 J. H. Hines Tie & Timber Co., wildcat, 9 miles northeast of Marksville, located in Section 6-3n-5e. Proposed depth is 7,000 ft.



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Canadian Fields

Multi-Pay Discovery on Production at St. Albert

CALGARY.—The multi-zone oil and gas discovery well at St. Albert was swabbed into production on January 1, was flowed from the D3 Devonian zone for a short period to clean out hole, and then shut in for installation of production equipment and tankage. This discovery, owned by a team comprised of Stanolind Oil & Gas Co., Imperial Oil, Ltd., Pacific Petroleums, Ltd., and Trans Empire Oils, Ltd., was assured of approximately 77 ft. of 34°-gravity oil-bearing D3 zone before entering formation water. In addition to the D3 oil, the St. Albert well found natural gas in the Viking, Ostracod, basal quartz and D2 Devonian zones, with the latter two horizons also yielding light gravity oil.

This five horizon discovery well is Stanolind-Imperial-St. Albert 1 Unit, LSD 3, 1-54-26w4, 2½ miles west of St. Albert town, 4 miles north-northeast of Acheson Devonian oil production and 5½ miles northwest of Edmonton. Top of D3 was found at 4,645 ft., 2,462 ft. below sea level, and that zone was productive of water-free crude oil down to approximately 4,722 ft. when water was encountered.

Drill-stem tests in the D3 flowed clean oil at rates up to 1,775 bbl. per day. Potential of the discovery well will be definitely determined following a 5-day production run which was commenced on January 3.

Marwayne Oils, Ltd., and Dragon Oils, Ltd., have found light gravity oil in the basal quartz at their driller in the Malmo area of central Alberta. This venture, on an 80-acre farmout from Hudson's Bay Oil & Gas Co., Ltd., and Imperial Oil, Ltd., gave up natural gas during first drill-stem test, on New Year's Day, and flowed oil during second test, run January 2.

This extension venture, Marwayne-Dragon 1-26 Malmo, LSD 1, 26-44-22w4, is ¼ mile north of High Crest-Albermont-Leduc Consolidated 1 New Norway D2 oil discovery well and 1¼ miles northeast of previous Cretaceous oil production. First drill-stem test, from 4,561-68 ft. flowed gas at rates estimated up to 7,000 M.c.f. per day. Test from 4,568-73 ft., flowed gas in 30 seconds at rate 920,000 cu. ft. daily, and flowed oil in 23 minutes. Recovery during the 35-minute test was 250 ft. clean oil and 10 ft. oil-cut mud. Coring and testing is being continued, and hole will also go down to test the D2 and D3 Devonian zones.

Imperial Oil, Ltd., has discovered natural gas in the Cretaceous formation at an exploratory well being drilled in the Bittern Lake area of central Alberta, a few miles west and south of Armena-Camrose area Viking oil producers. This venture lies on

a portion of the 8,383 acres acquired under exploration and development agreement from Central Leduc Oils, Ltd., and Del Rio Producers, Ltd., and is the second in a four well exploratory program that is being carried out at no cost to Central and Del Rio, who each have a 25 per cent interest.

The new strike was made at Imperial-Central-Del Rio 8-27 Bittern Lake, LSD 8, 27-47-22w4, on the northwest side of Bittern Lake. Cretaceous drill-stem test from 4,148-70 ft., for 38 minutes, gave a good initial puff, with a gas flow immediately, at maximum rate 4,920,000 cu. ft. daily. Recovery was 20 ft. of gassy oil-cut salty water. Second test, from 4,167-80 ft. gave up 2,940 ft. of salt water. Crew is now heading down for its Devonian objectives and is making hole below 4,260 ft.

Canada Southern Oils, Ltd., has been assured of Banff sand oil production at its 1¼ mile northwest extension test to the Buffalo Coulee heavy gravity oil pool, and is awaiting service rig to place the well on steady production. This new success, Canada Southern 11-21 Buffalo Coulee, LSD 11, 21-32-24w3, is 1¼ miles northwest of the Buffalo Coulee discovery well. No. 11-21 well indicated oil success during drill-stem tests in the Banff sand and was completed at 2,669 ft., after setting string of 6⅝-in. casing to 2,665 ft.

California

Extension To Buena Vista Hills Seems Assured

LOS ANGELES.—Extension of Buena Vista Hills' new Antelope fractured shale pool ½ mile further southeast seemed assured by the results of formation tests at Standard Oil Co. of California 522 15-D. Successful completion of the extensioner will establish a 3-mile northwest-southeast production trend along the crest of the Honolulu anticline.

The wildcat, in NE 15-32s-24e, on a 1-hour formation test at 4,780-4,880 ft. flowed 31°-gravity crude at an estimated 500-bbl. daily rate. On a second test at 4,880-4,980 ft., the well flowed at an estimated 150 bbl. rate on a 1½-hour test. Prior to the tests 8-in. casing had been set at 4,166 ft., just below the top of the Miocene chert.

About 7 miles northwest of this well, on the United anticline, Murvale Oil Co. halted drilling at 6,566 ft. in 74-22b "Well" and was preparing to plug back to test the Antelope shale zone. This deeper-zone test, in SE NE 22-31s-23e, is about ¾ mile north of the only Antelope zone producer to be completed on the northernmost of the two parallel anticlines.

Two northeast extensioners to Antelope production on the Honolulu anticline shortly will give a better idea of whether the zone will be productive in the valley between the two anticlines. These were Standard 522 1-C in NE 1-32s-23e and Honolulu Oil Co. 22-P "6" in NW 6-32s-24e. The former, which was preparing to run 8-in. casing at 3,700 ft., was about 1 mile northwest of nearest Antelope production on the Honolulu anticline.

In the Buena Vista Front area to the east, General Petroleum Corp. was rigging rotary for a Stevens zone test which will probably drill below 10,000 ft. The deep test, 33x-30 General American, will be drilled in NW 30-31s-24e, on a General American Oil Co. lease to which General Petroleum holds the deep rights.

Importance of the new Pyramid Hills pool discovered by Crown Drilling Co. in the Edison area, Kern County, was being evaluated by ½-mile southeast outpost and a second test shortly will be started. The pool opener, 76-8 Jeppi-Camp in NE SE 8-30s-29e, was completed flowing 330 bbl. daily through perforations at 5,817-39 ft. Stansbury-Well 81-17 Porter was under way in NE NE Section 17, and in NW NW Section 16 Des Moines Oil Co. was preparing to start 13-16 "Well." In the vicinity of NE NW Section 9, General Petroleum Corp. continued to develop Jewett-Vedder sand pool recently discovered on its Graham properties.

A deep-zone test on Tejon Ranch about 4 miles east of the Wheeler Ridge-Eocene discovery is scheduled to be drilled by Standard of California. The company has signed an operating agreement with Reserve Oil & Gas Co. for an 800-acre tract in 33-11n-19w and adjacent sections for drilling rights below 6,000 ft. Location of the test has not been announced. The test, to the Eocene, will probably be to about 13,000 ft.

About 3 miles northeast of this activity, Union Oil Co. staked location for 46-24 Reserve-Kerr in NE SW Section 24. The operator recently closed a deal with Reserve on 5,000 acres of the latter's lease-hold property. Aside from a few shallow wildcats the block is relatively untested.

Location for a new wildcat in the Ballinger Canyon area on the southeast end of Cuyama Valley was being prepared by General Petroleum. Site of the test is in NW 4-9n-24w.

In the Oakridge area of Ventura County, Union was plugging back a deep-zone test which failed to find lower Sespe production. The well, 11-3 Oakridge in 3-3n-18w, was the second which failed to find the deep pay which is being developed at Torrey Canyon, 1½ miles west. It will be completed in the 3,500-ft. reguar pay.

CALIFORNIA SUCCESSFUL WILDCAT

Kern County, new pool discovery in Edison area: Crown Drilling Co. 76-8 Jeppi-Camp, NE SE 8-30s-29e, flowed 330 bbl. per day, through perforations at 5,817-5,839 ft., 38.2° gravity, 16/64-in. bean. TD 5,817 ft., elev. 512 ft.

CALIFORNIA WILDCAT FAILURES

Kern County, Lost Hills area: Richfield Oil Corp. 1 Lost Hills Fee F, 12-26s-20e, dry, TD 3,214 ft., elev. 379 ft.

Universal Cons. Oil Co. 122 "Well," 18-26s-21e, dry, TD 3,020 ft., elev. 385 ft.

Bowerbank area: Rexroth & Rexroth 1-A Salisbury, 7,29s-24e, dry, Salisbury sand 4,720 ft., TD 4,854 ft., elev. 280 ft.

Rosedale area: Humble Oil & Refining Co. 1 L. J. Curtis, 23-29s-26e, dry, TD 6,068 ft., elev. 367 ft.

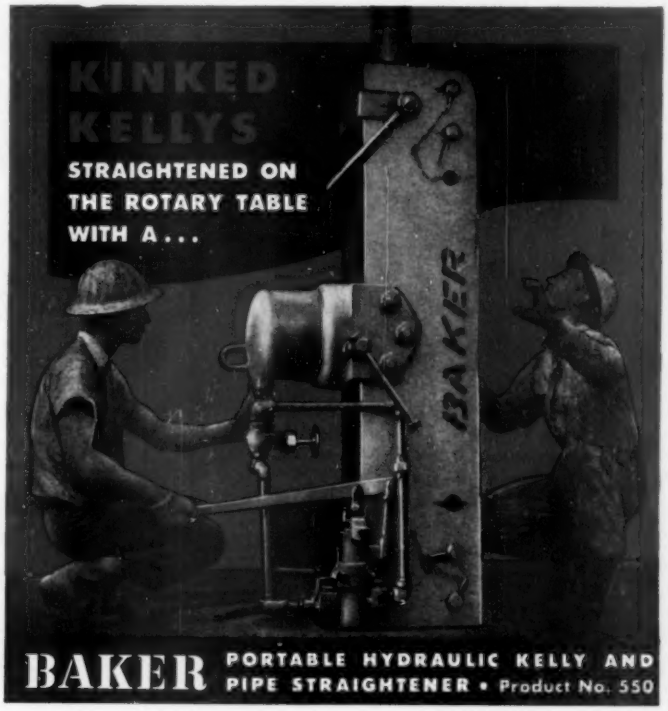
Tejon area: Richfield Oil Corp. 53-8 Tejon A, 8-10n-19w, dry, TD 3,798 ft., elev. 1,271 ft.

Tejon Hills area: Pedro Petroleum Corp. 2 Pedro, 11-11n-18w, dry, granite 111 ft., TD 116 ft., elev. 1,365 ft.

Tunis Creek area: D. K. Partnership 2, 82-29 Corral, 29-11n-18w, dry, TD 2,920 ft., elev. 843 ft.

Madera County, Moffatt area: Lebow-McNee Oil Co. 1 Lowry Lytle-Strathearn, 31-11s-15e, dry, TD 4,250 ft., elev. 160 ft.

Monterey County, Pinyon Creek area: General Petroleum Corp. 35-29 Hotchkiss,



29-22s-9e, dry, TD 6,259 ft., elev. 1,842 ft.

San Luis Obispo County, Paso Robles area: Louis Cass, Jr. 77 L & B, 31-25s-12e, dry, TD 3,495 ft., elev. 732 ft.

Ventura County, Ozena area: D. K. Partnership 4, 54-7 Jamieson, 7-7n-22w, dry, TD 3,300 ft., elev. 4,287 ft.

Appalachian-Ohio

Tests On Chestnut Ridge Anticlinal Trend Are Dry

COUDERSPORT, Pa. — Testing of the Chestnut Ridge anticlinal trend southwest of Leidy gas field has resulted in completion of two more dry holes. A total of 4 dry holes have now been drilled in the complex structural area near Sinnemahoning in Gibson Township, Cameron County, Pennsylvania.

Latest dry test was Manufacturers Light & Heat Co. 2 State of Pennsylvania (Tract D). Oriskany top was 7,426 ft. (elev. 1,918 ft.) and total depth 7,442 ft.

Three miles southwest of the No. 2 location Manufacturers completed 1 State of Pennsylvania (Tract D). Oriskany was 6,504 ft. and total depth 6,523 ft. (elev. 1,111 ft.)

In Benezette Township, Elk County, Pennsylvania, Keta has cleared location on 2 Charleroi Mt. Club. This location is ¼ mile northwest of Keta's successful Oriskany wildcat on the same property.

Deep Rock Oil Co.'s 1 Walizer in Greene Township, Clinton County, Pennsylvania is still troubled with lost circulation at 500 ft.

In Parks Township, Armstrong County, Southwest Pennsylvania, Peoples Natural Gas Co. 4015, M. Wherry, resulted in a good shallow sand gas well gaging 2,700,000 cu. ft., at a total depth of 1,985 ft. and is one of the best wells to have been struck in this area in recent years. Unity Township, Westmoreland County, Peoples Natural Gas Co. 4003 A. J. Dotterway, is drilling at 8,648 ft., No. 4008 J. R. Frola, is at 7,084 ft. Greenville Township, Somerset County, New York State Natural Gas Corp. 1-320 M. V. Newman is drilling at 830 ft.

West Virginia.—Williamsburg district, Greenbrier County, West Virginia: Deep Rock Oil Corp. 1 Bertha Thornbury, elevation 2,420 ft., gas testing 696,000 in the chert and Oriskany sand, recorded the top of the Williamsport sand at 7,372 ft., and is straightening bad hole at 7,386 ft. Union district, Preston County, Cumberland & Allegheny Gas Co. 488, Walter Nine, was acidized and increased the flow of gas from 105,000 cu. ft. to 177,000 cu. ft. It will be re-acidized; No. 493 George W. Cramer, shut down at 5,002 ft., and casing was run at 5,258 ft., in No. 494 Lloyd Taylor. Hope Natural Gas Co. 9752 Clara L. Barry, is shut down at 4,720 ft. to run casing in the top of the chert.

Maryland.—Garrett County, Maryland, W. H. and A. A. Rader 1 Pleasant Valley Church, which reached the Oriskany sand at 4,020 ft., reported gas at 4,023 ft., testing 95,000 cu. ft. Drilling is at 4,097 ft., Eberly & Snee 1 McCullough heirs, is shut down at 7,123 ft., in the chert.

OHIO

An endeavor to extend Mount Zion pool ⅔ mile to the southwest resulted in a gasser in the upper part of the sand. The test, on J. W. Kidd, Section 1, Eden Township, Licking County, topped the Clinton at 2,959 ft. and finished at 17 ft. in the sand with an open flow of 600,000 cu. ft. natural.

James Shearer 1 F. J. Funk, Section 10, Jefferson Township, Coshocton County, ¾ mile west of a small wildcat producer, logged Clinton at 3,538-85 ft., having a small show of oil. The test was shot with 100 qt. and made an estimated 10 bbl. in 24 hours.

In Pike Township, Coshocton County, Mid East 2 Perry Ashcraft, Section 4, a ½-mile stepout, made 75 bbl. in 24 hours after a 150-qt. shot. Clinton sand was found at 3,178-3,230 ft. with a fair showing of oil natural.

PENNSYLVANIA SUCCESSFUL WILDCATS

Clinton County: Parson Bros. 3 State of Pennsylvania (Tract 23) flowed 15,000 M.c.f. of gas, RP 3,550, TD 7,203 ft. (new pool discovery in Leidy gas field).

Elk County: Keta Gas & Oil Co. 1 Charleroi Mt. Club, OF 2,500 M.c.f. of gas, RP 3,900 psi., Oriskany 6,942 ft., TD 6,965 ft.

PENNSYLVANIA WILDCAT FAILURES

Cameron County: Manufacturers Light & Heat Co. 1 State of Pennsylvania (Tract D), dry, TD 6,523 ft.

Manufacturers Light & Heat Co. 2 State of Pennsylvania (Tract D), dry, TD 7,442 ft.

Keta Oil & Gas Co. 2 State of Pennsylvania (Tract D), dry, TD 7,463 ft.

OHIO WILDCAT FAILURES

Vinton County, Vinton Township: Frank O'Mara et al. 1 New York Coal Co., Sec. 33, Clinton 3,029-35 ft., TD 3,137 ft.

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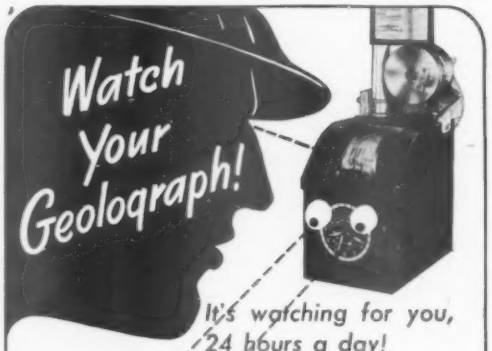

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Calgary and Edmonton, Alberta, Canada
Regina, Saskatchewan, Canada

Washington County, Adams Township: Copper Oil & Gas Co. 1 E. J. Jackson, Lot 59, Oriskany 4,627-32 ft., TD 4,632 ft.

Oklahoma

Logan County Wildcat Finds Deeper Oil Pays

MacMILLAN PETROLEUM CORP. and associates have indications of production from second Wilcox sand at their 1 Krout, NE NW SW 14-15n-4w, southwest of Navina, southwestern Logan County. This prospective discovery well, which previously encountered promising gas and distillate showings in the Simpson dolomite and first Wilcox sand, is located northeast of the Northeast Lockridge gas-distillate area, and about a mile south of the West Navina field, nearest other production.

Top of the second Wilcox was logged at 6,452 ft. Pay was penetrated to 6,480 ft. where a drill-stem test, taking in from 6,440 ft., was made, getting a gas flow in 5 minutes estimated at 30,000 to 40,000 cu. ft. per day, and an oil flow in 27 minutes estimated at 20 to 25 bbl. of oil per day. Gravity of the oil was 38.6°. Tester was open 52 minutes. Operators plan to deepen the hole to the Arbuckle.

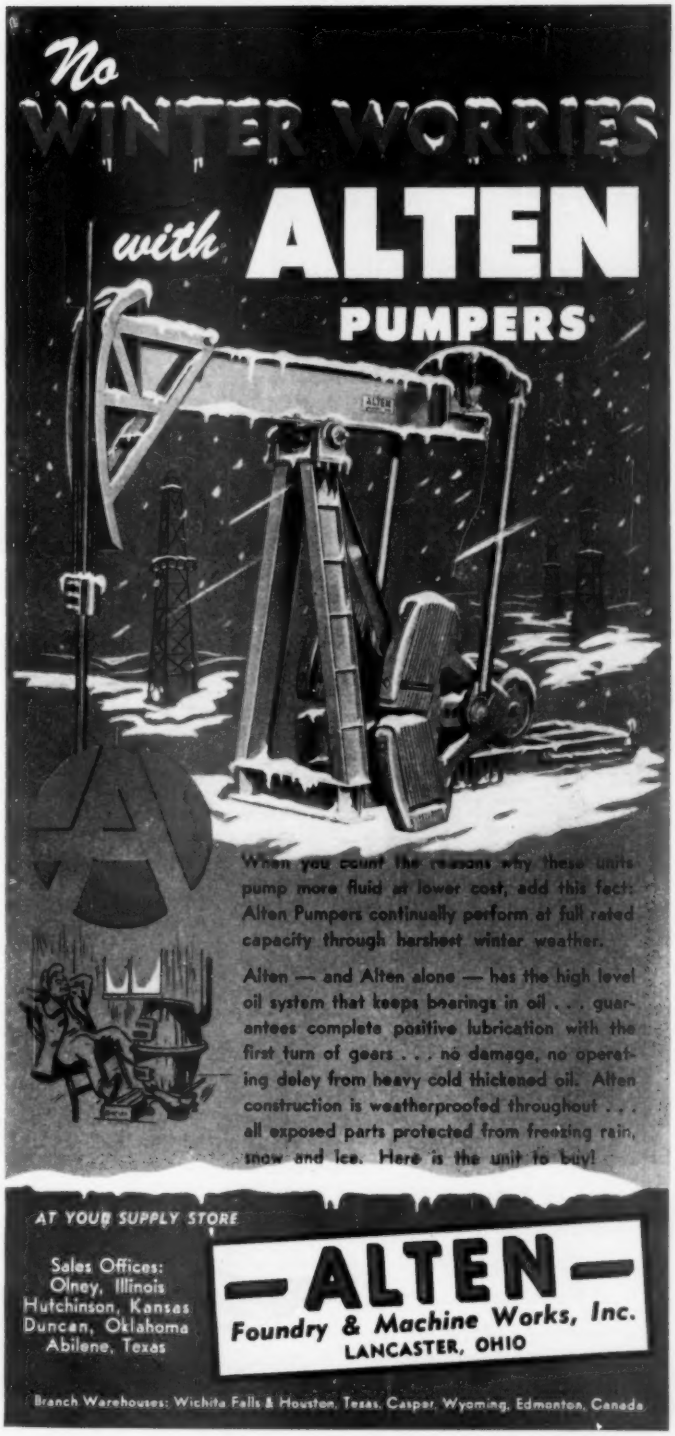
Ashland Oil & Refining Co.'s Misener-sand discovery-well, 1 Byers, NW NW SW 1-19n-3w, 5 miles east of Marshall, in northwestern Logan County, flowed 18 bbl. of oil per hour through ½-in. choke. Pay is open through casing perforations at 5,631-40 ft. with top logged at 5,617 ft. The well tested water in the Wilcox, opposite which casing had been perforated at 5,862-68 ft. and 5,748-81 ft. Total depth is 5,995 ft. Location is 1¼ miles southeast of the recently opened Northeast Elkhorn pool, productive from the Wilcox.

The recently opened Northeast Prairie Valley pool in Garfield County is getting its second producer, a west offset to the discovery well. It is Mercury Drilling Co. 1 Cogswell heirs, SW SE NW 5-23n-4w, which flowed approximately 100 bbl. of oil in 5 hours through ¼-in. choke with gas at the rate of 554,000 cu. ft. per day from Misener sand, and 6,980,000 cu. ft. of gas per day with a spray of distillate from the Mississippian. The Misener, opposite which casing is perforated at 5,977-81 ft., is a new pay zone. The Mississippian, opposite which casing is perforated in a series of intervals from 5,472 to 5,539 ft., also produces gas in the discovery well. The latter well also produces oil from the second Wilcox, giving the field three pay zones. It was completed in October by F. A. Gillespie and Fordee Rhoades Oil Co.

Production of the rapidly developing East Payson field, in Lincoln County, is being extended ½ mile to the north and east by Morgan Drilling Co. at its 1 James, SW SE SW 25-13n-4e. Testing the field's lower Skinner pay sand, in open hole at 4,047-70 ft., the well swabbed 4 bbl. of oil per hour natural. Pay will be shot for further testing. The field, opened last April by Gulf Production Corp., now has 25 producing wells with 7 active operations.

OKLAHOMA WILDCAT FAILURES

Garfield County: Olson Oil Co. 1 Sharp, SE SW SW 35-20n-3w, TD 6,047 ft.
Jackson County: Dobbins & Barnes 1 Ely, SW SW SW 19-1n-19w, dry, TD 2,515 ft.
Payne County: Midwest Oil Corp. 1 State School Land, NW SE SW 16-18n-1w, dry, TD 5,544 ft.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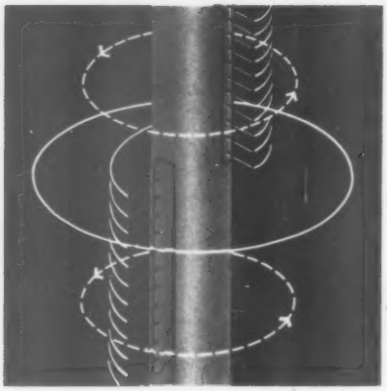

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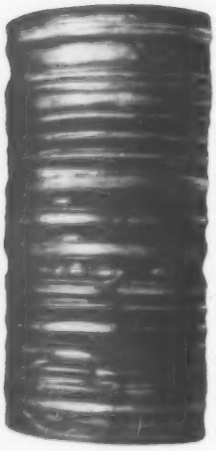

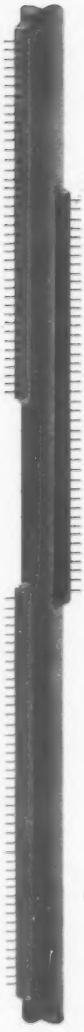

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Rocky Mountain

Two Williston Areas Hold Regional Attention

DENVER.—New wildcat shows in widely separated Rocky Mountain areas characterized the first week of 1953, but the week ended without a successful wildcat completion in any part of the region.

Two Williston basin areas where promise of discovery is held out by shows in several wildcats held the attention of operators in the North Dakota-Montana area.

In eastern Montana's Richland County, Sun Oil Co. and Phillips Petroleum Co. reported shows in Mission Canyon (Madison) at the 1 Dynneson, C SW NE 32-24n-58e, northwest of the town of Sidney. The well, a scheduled test of the Ordovician, recovered shows of oil in mud and slight oil and gas-cut mud on tests of the intervals 9,085-9,136; 9,232-77; and 9,222-77 ft. Cores of the interval 9,136-9,373 ft. had slight oil shows and some odor, but little to no porosity. The operator is at 9,373 ft., and will run further tests before drilling ahead.

This wildcat is an important test in the general eastern Montana area, south of the eastern Roosevelt County district where Deep Rock Oil Corp. is abandoning a failure after some shows in Mississippian formations.

Bottineau County, North Dakota, first area of the basin to show promise of shallow production, is the most active wildcat area in the state at the present time. Zack Brooks-Crawford Smith are pumping the potential discovery well in the Turtle Mountain area of this county at the rate of 90 bbl. of fluid daily, of which 25 per cent is oil. The well is 1 Berentson, C SW SE 21-163n-80w. Murry and Monson have recovered oil-cut mud and gas-cut salt water from the 1 Stravheim, SE SE 33-64n-79w, wildcat northeast of the Brooks-Smith well. At least three other wildcats in the area have had some shows, but none have been established as definitely commercial producers. Production in the area is from Mississippian rocks with first shows in most cases encountered in Spearfish.

In Slope County, North Dakota, Stanolind Oil & Gas Co. has begun tests of the 1 Brusich, SE SE SE 8-135n-98w, and swabbed water and mud from the zone 8,592-8,600 ft. Perforations in this interval have been squeezed and casing perforated from 8,580-88 ft. for further testing. This wildcat had shows in the general interval 8,500-8,700 ft. during drilling.

Los Nietos-Hancock-Signal are waiting on orders at the 1 Nuhring, C NW NE 32-35n-47e Daniels County, Montana, after swab tests of Mississippian and Devonian zones which had small shows during drilling produced only water.

C. H. Murphy, Jr., has released completion data for three new producers in East Poplar field of Roosevelt County, Montana. The 11 Unit, C NE NW 10-28n-51e, made 124 bbl. of oil and 14 of water from two zones in Charles and Madison. The 12 Unit, C SW SE 3-28n-51e, initialed for 21 bbl. of oil daily, following acidization of several intervals. Both these wells are on the western edge of development to date. The 18 Unit, C SE NW 2-28n-51e, made 476 bbl. of oil in 24 hours through 6/64-in. choke from two Madison zones. It is ¾ mile west of the discovery well, and in line with the general trend of production in this field.

Shell Oil has announced location for 22-33 Unit, NE SE NW 33-10n-58e, in the Cabin Creek area of Fallon County, Montana, northwest of the Little Beaver discovery and southwest of Pine Unit field. This location

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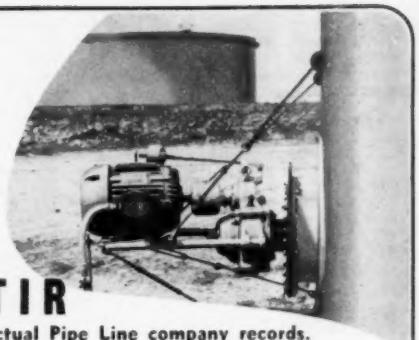
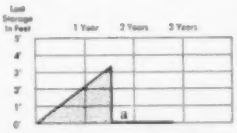


as proven by actual Pipe Line company records.



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January 8, 1953.

is on lands unitized recently by Shell and including the first acreage to be dealt by Northern Pacific Railroad under terms of its recently announced land policy for administration of railroad land in the Williston basin.

In the North Park area of Jackson County, Colorado, Placid Oil Co. has plugged back 1 Johnson, C NE NE 22-8n-78w, for test, with casing cemented at 3,000 ft. The wildcat went to 8,115 ft., with fish in the hole at that depth. The wildcat is 20 miles northeast of the recent discovery in the Coalmont anticline area by Benedum-Trees interests which was tested for one of the best initials in Colorado history.

(Continued on page 183)

Kansas

Western Kansas Wildcats Uncover Three New Pools

FAVORABLE indications of production have been encountered in three rank wildcats in western Kansas, one in northwestern Pawnee County, another in northwestern Sheridan County, and the third in southeastern Ford County.

In Pawnee County, M. B. Armer 1 Ellis, SE SE NE 9-20s-19w, more than 15 miles west of nearest production along the Central Kansas Uplift, recovered 1,500 ft. of oil and 185 ft. of muddy oil in a 60-minute drill-stem test in the top of the conglomerate zone at 4,200-20 ft. It now has casing run for completion. It logged Lansing at 3,723 ft. and the Marmaton at 4,061 ft. with a surface elevation of 2,250 ft.

The Sheridan County wildcat, West-Hydrocarbon Co. 1 Wessell, SW NW NW 27-6s-29w, 14 miles southwest of the Adell pool, nearest production on the west side of the Central Kansas Uplift, recovered 570 ft. of oil in a 20-minute drill-stem test at 4,005-28 ft. in Lansing lime, topped at 3,944 ft. with surface elevation at 2,818 ft. Deepened, it found Mississippian at 4,448 ft. and Arbuckle at 4,602 ft. At a total depth of 4,720 ft., no showings of consequence had been encountered below the Lansing. Casing has been run through the Lansing pay, and hole plugged back for completion in that zone.

In Ford County, M. B. Armer 1 Helmers, NE NE SE 25-28s-21w, flowed at the rate of 1,700,000 cu. ft. of gas and recovered 90 ft. of gas-cut mud in a 60-minute drill-stem test at 5,017-45 ft. in the top of the Mississippi chert. Location is 5 miles south of the small, isolated Pleasant Valley oil pool, only other production in the county. Nearest other production is in the Excel pool, southwestern Kiowa County, another small, isolated pool. The county lies in the middle of the Hugoton embayment.

Lewis Drilling Co. 1 Reidel, a wildcat located in the SW SE SW 8-14s-19w, a mile south of the Irvin pool, in southwestern Ellis County, recovered 10 ft. of free oil and 16 ft. of heavily oil-cut mud in a 60-minute drill-stem test at 3,832-49 ft. in Arbuckle lime, topped at 3,837 ft. (surface elevation 2,210 ft.). Production tests are being started with casing run to 3,839 ft.

KANSAS SUCCESSFUL WILDCATS

Ellis County: Victor Drilling Co. et al 1 Windholz, SW SW NE 6-13s-16w, IP 600 bbl. of oil per day from Lansing 3,291-96 ft., TD 3,570 ft.

Graham County: Murfin Drilling Co. 1 Davis, SW NW SW 15-6s-22w, IP 31 bbl. of oil per day from Lansing 3,694-3,703 ft., TD 3,874 ft.

KANSAS WILDCAT FAILURES

Butler County: Aledo Oil & Gas Co. and Murfin Drilling Co. 1 Dickson, SW SE SE 36-25s-6e, dry, TD 2,758 ft.

Cowley County: Earl Wakefield 1 Cloud, NW NW SW 3-31s-5e, dry, TD 3,035 ft.

Ellsworth County: Hinkle Oil Co. 1 Becker, NE SE NE 35-16s-9w, dry, TD 3,261 ft.

Graham County: Harry Gore and Empire Drilling Co. 1 Culp, SE SE NW 17-8s-22w, dry, TD 3,790 ft.

Lyon County: Ben Brack 1 Williams, NW NW NW 18-21s-10e, dry, TD 2,885 ft.

Marion County: Western Central Petroleum Co. 1 Knaak, C S½ S½ SW 24-19s-2e, dry, TD 2,975 ft.

Pawnee County: Amerada Petroleum Corp. 1 Franklin, SE NE NE 35-20s-16w, dry, TD 3,815 ft.

Phillips County: Musgrove Petroleum Co. 1 Wiltrout, SE SE SW 10-5s-20w, dry, TD 3,525 ft.

Reno County: Musgrove Petroleum Co. 1 Jones, SW SW NE 19-25s-9w, dry, TD 4,221 ft.

W. L. Hartman 1 Hilger, NE SE SW 17-26s-4w, dry, TD 4,160 ft.

Rice County: Morrison Drilling Co. 1 Howe, SW SW SE 32-21s-9w, dry, TD 3,667 ft.

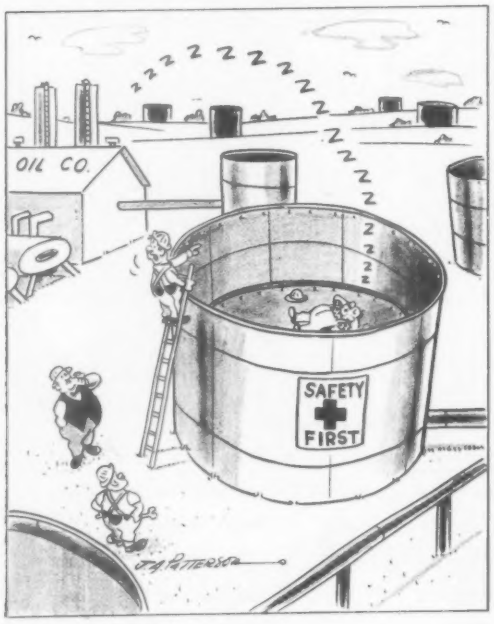
Rush County: Lion Oil Co. 1 Treloggen, NE NE NE 13-17s-16w, dry, TD 3,645 ft.

Stafford County: M. B. Armer 1 Howard, SE SE SE 32-22s-12w, dry, TD 3,750 ft.

Aiking & Robinson 1 Tucker, NE NE NW 28-22s-14w, dry, TD 3,974 ft.

Lindas Oil 1 Asher, SW SW NE 35-24s-13w, dry, TD 4,210 ft.

Westgate-Greenland 1 Wilson, SW NE NE 6-25s-14w, dry, TD 4,440 ft.



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Central Area

ILLINOIS

A half-mile extension of production in the area 5 miles southeast of Norris City, in White County, is in the making where E. J. Cunningham is testing saturation found in Benoist sand at his 1 Downen, NW SE SE 5-7s-9e. The well, located east of the north end of the Roland field and west of the Herald field, swabbed initially at the rate of 3 bbl. of oil per hour naturally. Operators expect to fracture the pay in an effort to improve production. Pay is open through casing perforations at 2,893-2,902 ft.

Promising oil showings have been found in the St. Louis lime by Superior Oil Co. at its 8-C Ford, SW SW SE 27-4s-14w, a mile west of New Harmony (Indiana), in the New Harmony field, White County. Showings were the best yet found in that horizon by any well in that field, and so far no attempts have been made to complete a well in that pay. Two drill-stem tests were made, one of 25-minute duration at 3,143-53 ft. getting gas in 15 minutes and recovering 75 ft. of clean oil and 100 ft. of mud-cut oil without any water. The second, at 3,255-85 ft. and open 2 hours, got 1,700 ft. of gas, 5 ft. of oil and 600 ft. of oil and gas-cut mud.

Passing up this pay for the time being, operators also have encountered showings in the deeper Salem lime, comparatively recently established as a new producing horizon for the field. A 60-minute drill-stem test at 3,615-46 ft. in the upper Salem, recovered 32 ft. of oil-cut mud. At latest report, operators were coring ahead in middle Salem below 3,725 ft. Location of the well is only 330 ft. southwest of the same company's 17-C Ford, the field's Salem-lime discovery well. The latter well, before plugging back and completing in the Salem, had been drilled to 7,682 ft. as the Illinois basin's deepest test.

INDIANA

R. O. Wilson and Sam Gellar are starting production tests at their 1 Ward unit, SW SW NW 33-2s-11w, a semiwildcat 2 miles northeast of Owensville, northern Gibson County. This prospective well, ¾ mile from nearest other production, found good saturation in Cypress sand at 2,127-42 ft., and in a 60-minute drill-stem test got 20 ft. of oil and 20 ft. of oil-cut mud without any water. Since that test, hole has been drilled to 2,462 ft. and casing run through the indicated pay.

T & H Corp.'s Salem-lime discovery well, 1 Deep Vein, SE SE NE 11-2s-12w, in the Lyles area, 8 miles west of Princeton, northern Gibson County, has been put on the pump for completion, making approximately 100 bbl. of oil per day. Production is from casing perforations at 2,675-80 ft. and 2,683-88 ft. with bottom of the hole at 2,710 ft. Prior to going on the pump, the well swabbed 16 to 17 bbl. of oil per hour. Although the well is only ¼ mile from other wells, this is the first Salem production in the entire Princeton-Mount Carmel area. Nearest Salem production is 20 miles distant.

WESTERN KENTUCKY

E. G. Burke, Sr., 1 Jackson heirs, new pay-opener and extension well for the small-producing area southeast of Dixon, Webster County, has been completed on the pump making between 55 and 60 bbl. of oil per day. The well, 1,500 ft. east of the discovery well, completed late in 1950 as a small pumper in O'Hara lime at 3,109-13 ft., produces from Hardinsburg sand at 2,686-2,719 ft.

MICHIGAN

Another Dundee objective well in the Pinconning field area, Pinconning Township, Bay County, came close to making a commercial Traverse oil producer and may lead to the drilling of more wells in the area in search of a Traverse pool. Newest well to show in the Traverse was the Charles Morley 3 Szyperski, NE NE SW 25-17n-4e. Well topped Alpena Traverse at 2,151 ft. Oil showed at 2,158-59 ft. Well flowed 30 bbl. of oil in 2 hours from an open hole and then died. On another test well flowed 70 bbl. in 3 hours. Both flows showed about a 4 per cent water cut. After tubing was run for a more regulated test of the Traverse, well flowed about 60 bbl. of fluid, showing from 75 to 90 per cent water. Operator elected to mud off Traverse porosity and head for the Dundee.

But on the basis of the Traverse oil showing at the 3 Szyperski, and previously at the 2 Szyperski, Ogma Development Co. announced that it would start a test in the area, at the 2 Breu, SW SW NE 25-17n-4e, which, if structurally favorable on the top of the Traverse, will be cased with a long string before the Traverse is penetrated, in an effort to get a better test of this likely new producing horizon in the Pinconning field. Another new start in Pinconning field area this week, by Don Rayburn at the 1 Ritter, E½ NW NE 25-17n-4e, has the Dundee as its primary objective but will be cored and watched closely as the Traverse zone is penetrated.

ILLINOIS WILDCAT FAILURES

Clark County: The Texas Co. 1 Yeley, NW NW SE 27-12-11w, dry, TD 2,310 ft.
Montgomery County: The California Co. 1

(Continued on page 182)

MOBILE LABORATORIES

From the far northern reaches of Canada to the islands of the Caribbean, from the deserts to the mountains to the seashore—TRAVELITE is by far the best built trailer on today's market—especially the trailer designed for mobile laboratories and offices. Built to withstand the most rugged conditions, TRAVELITE trailers are performing a vital function in today's oil operation all over the world.

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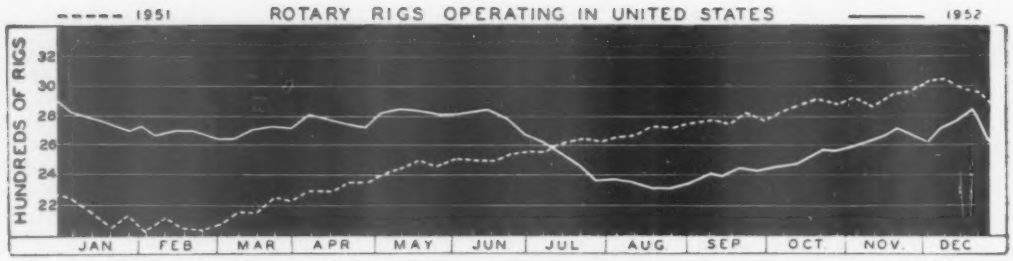
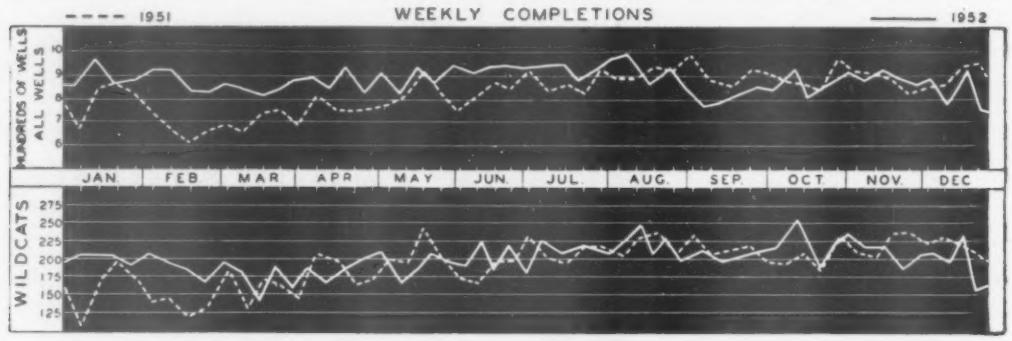
FROM THE ARCTIC TO THE TROPICS — TRAVELITE IS THE BEST TRAILER COACH ON THE MARKET

Most Complete Line of Any One Trailer Coach Factory, seven different sizes, and twenty different floor plans. TRAVELITE trailer coaches also make ideal mobile housing for mobile workers.

Travelite
TRAILER CO. OF TEXAS
2730 BRYAN ST. Phone WEbster 1953 FORT WORTH, TEX.





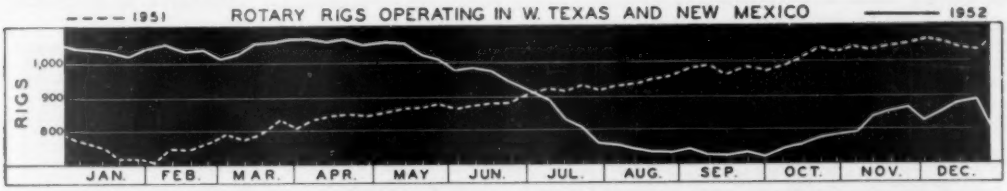
CURRENT STATISTICS

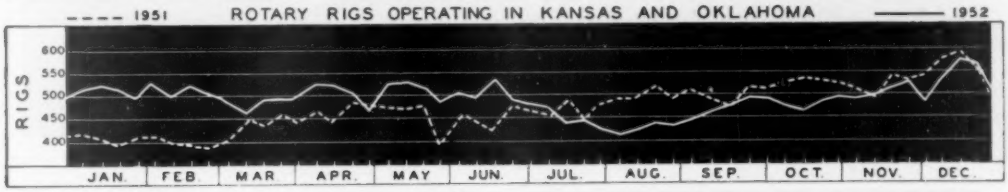
EXPLORATION

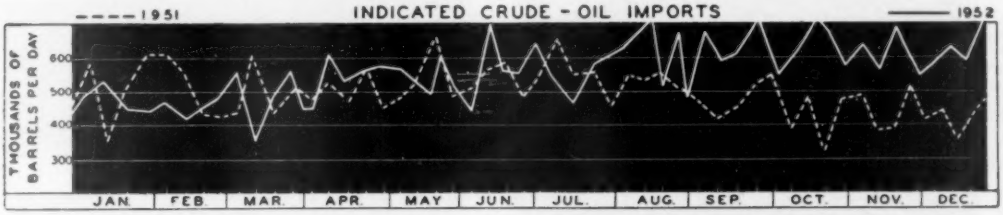
WEEKLY WELL COMPLETIONS . . . WEEK ENDED JANUARY 3, 1953

	Total of all wells					Jan. 3		Wildcat completions and discoveries					Cumulative total, 1953				
	Comp.	Oil	Gas	Dry	Footage	1953	1952	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	14	7	0	*7	22,550	6	3	0	0	0	0	0	0	0	0	0	0
Pennsylvania	39	19	5	†15	86,378	16	12	0	0	2	3	5	0	0	2	3	5
West Virginia	7	1	4	2	17,699	3	5	0	0	0	0	0	0	0	0	0	0
Ohio	18	3	4	‡11	49,244	7	6	0	0	0	2	2	0	0	0	0	0
Indiana	11	2	0	9	21,818	4	10	0	0	0	1	1	0	0	0	0	0
Kentucky	10	4	0	6	18,411	4	13	0	0	0	3	3	0	0	0	1	1
Illinois	24	11	0	13	60,735	10	17	0	0	0	4	4	0	0	0	1	1
Michigan	11	4	2	§5	32,727	4	6	1	0	0	2	3	1	0	0	2	3
Kansas	50	18	3	29	173,728	21	31	2	0	0	16	18	0	0	0	6	6
Nebraska	5	2	0	3	28,233	2	4	0	0	0	3	3	0	0	0	1	1
Oklahoma	111	56	6	49	399,485	47	45	0	0	0	3	3	0	0	0	3	3
Texas	255	145	15	95	1,266,824	107	112	13	1	6	64	84	5	0	1	25	31
North Central (Dist. 7-B & 9)	83	47	1	35	278,489	35	39	10	0	1	24	35	4	0	0	10	14
West (Dist. 7-C & 8)	64	52	0	§12	388,119	27	36	2	0	0	7	9	1	0	0	3	4
Panhandle (Dist. 10)	8	4	2	2	25,035	3	4	0	0	0	2	2	0	0	0	0	0
Eastern (Dist. 5 & 6)	8	3	0	5	46,047	3	4	0	0	0	3	3	0	0	0	1	1
Gulf Coast (Dist. 2 & 3)	44	17	6	21	305,696	19	14	0	0	2	15	17	0	0	0	6	6
Southwest (Dist. 1 & 4)	48	22	6	20	223,438	20	15	1	1	3	13	18	0	0	1	5	6
Louisiana	61	36	2	23	327,275	26	25	1	0	0	6	7	1	0	0	2	3
Northern	43	27	1	15	143,922	18	16	1	0	0	6	7	1	0	0	2	3
Southern	18	9	1	8	183,353	8	9	0	0	0	0	0	0	0	0	0	0
Arkansas	12	5	0	7	37,069	5	5	0	0	0	2	2	0	0	0	2	2
Mississippi	5	2	0	3	43,700	2	5	0	0	0	2	2	0	0	0	2	2
Southeastern States	3	1	0	2	14,197	1	0	1	0	0	2	3	1	0	0	2	3
Montana	12	8	0	4	46,454	5	5	0	0	0	1	1	0	0	0	0	0
Wyoming	12	4	1	7	43,368	5	13	0	0	0	4	4	0	0	0	1	1
Colorado	10	1	1	8	51,383	4	3	0	0	0	5	5	0	0	0	2	2
Utah	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Mexico	9	7	1	1	38,917	3	10	0	0	0	0	0	0	0	0	0	0
California	56	43	0	13	247,045	24	21	1	0	0	11	12	0	0	0	4	4
North Dakota	3	3	0	0	24,962	1	1	0	0	0	0	0	0	0	0	0	0
Miscellaneous (S. D.)	1	0	0	1	4,504	1	1	0	0	0	1	1	0	0	0	0	0
Total United States	739	382	44	313	3,056,706	308	353	19	1	8	135	163	8	0	3	57	68
Total previous week	756	387	50	319	2,953,913			16	2	3	134	155					
Total January 5, 1952	859	454	64	341	3,570,165			36	3	4	163	206	25	2	3	111	141

Service wells included: *7, †12, ‡2, §1.



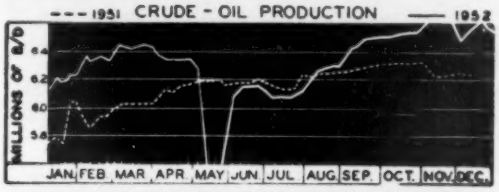


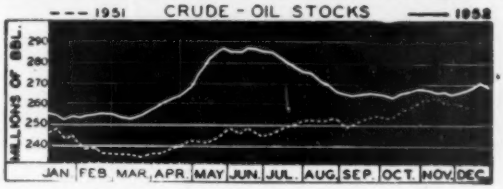


DAILY AVERAGE PRODUCTION FOR WEEK

	January 3, 1953 — Crude oil	Lease condensate	Total	Dec. 27 total
Alabama	3,700		3,700	3,400
Arkansas	75,950	650	76,600	77,000
California	991,700		991,700	990,500
Colorado	96,200		96,200	84,800
Eastern	55,000		55,000	55,100
Florida	1,525		1,525	1,525
Illinois	168,000		168,000	169,100
Indiana	33,700		33,700	33,200
Kansas	295,900		295,900	335,000
Kentucky	30,500		30,500	31,100
Louisiana	652,700	34,600	687,300	683,800
North	111,050	2,600	113,650	114,300
South	541,650	32,000	573,650	569,500
Michigan	32,900		32,900	36,500
Mississippi	91,800	4,100	95,900	96,250
Montana	24,200		24,200	29,600
Nebraska	8,300		8,300	9,100
New Mexico	176,500	450	176,950	175,725
Oklahoma	537,700		537,700	538,100
Texas	2,926,750	48,275	2,975,025	3,013,525
Dist. 1	38,000	250	38,250	38,925
Dist. 2	166,500	5,200	171,700	174,950
Dist. 3	480,450	25,200	505,650	509,700
Dist. 4	263,850	5,900	269,750	274,150
Dist. 5	53,925	350	54,275	55,350
Dist. 6	130,500	5,100	135,600	138,575
East Texas field	264,000		264,000	265,150
Dist. 7-B	115,525	100	115,625	118,400
Dist. 7-C	170,375	5,300	175,675	175,925
Dist. 8	974,450	350	974,800	991,425
Dist. 9	188,875	500	189,375	190,250
Dist. 10	80,300	25	80,325	80,725
Utah	4,800		4,800	5,300
Wyoming	222,200		222,200	191,500
North Dakota	11,000		11,000	9,600
Total U. S.	6,441,025	88,075	6,529,100	6,569,725
Change from previous week, down			40,625	
Canada	201,475		201,475	204,000
Total U. S. production January 1-3				19,587,300 bbl.
Same period last year (crude plus cond.)				*18,635,760 bbl.

*Includes 283,080 bbl. condensate.



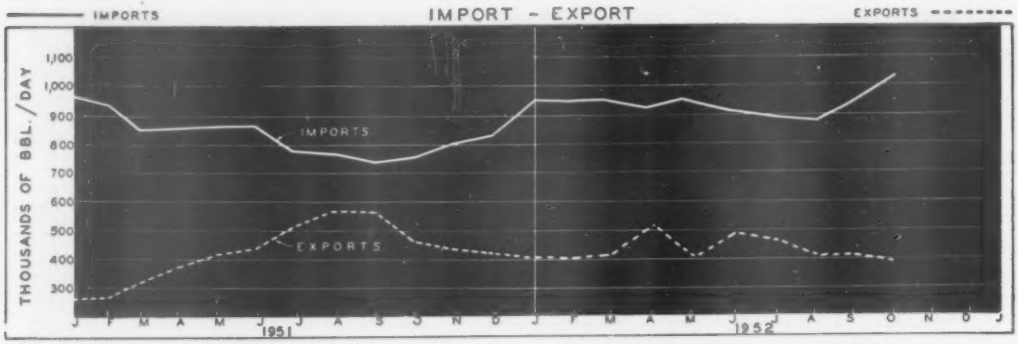


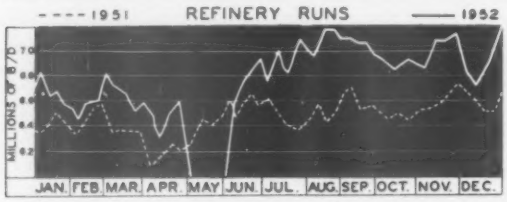
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

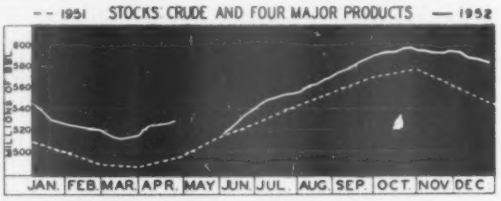
(Thousands of barrels)

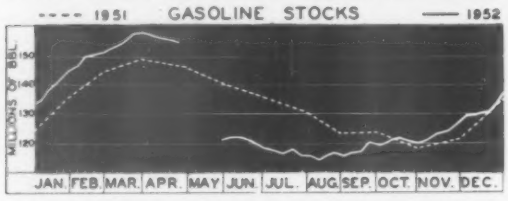
	Dec. 27, '52	Dec. 20, '52	Dec. 29, '51
Pennsylvania Grade	2,169	2,273	1,881
Other Appalachian	1,785	1,691	1,875
Illinois, Indiana, Michigan	10,673	11,065	11,939
Arkansas	3,213	3,305	2,911
Louisiana	15,451	16,267	13,737
North	2,342	2,350	2,803
Gulf	13,109	13,917	10,934
Mississippi	3,060	3,072	3,330
New Mexico	7,427	7,426	7,369
Oklahoma and Kansas	36,763	37,452	40,890
Texas	133,643	135,004	124,082
East Texas proper	11,343	12,158	(†)
West Texas	61,156	61,596	(†)
Texas Gulf	26,452	26,589	(†)
Other Texas	34,692	34,661	(†)
Rocky Mountain	14,431	14,773	13,223
California	31,462	31,504	29,821
Foreign	8,633	7,952	5,379
Total	268,710	271,784	256,437

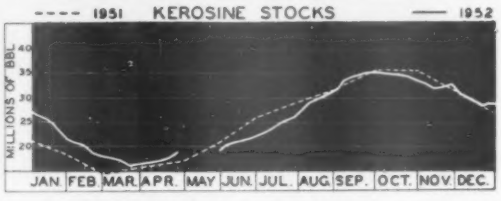
*Bureau of Mines. †Not comparable with current week.

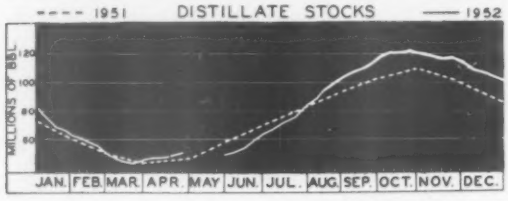


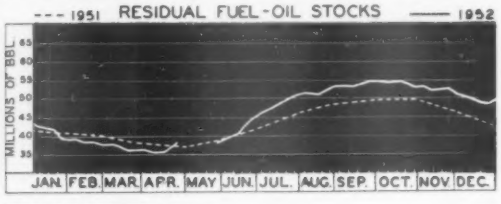












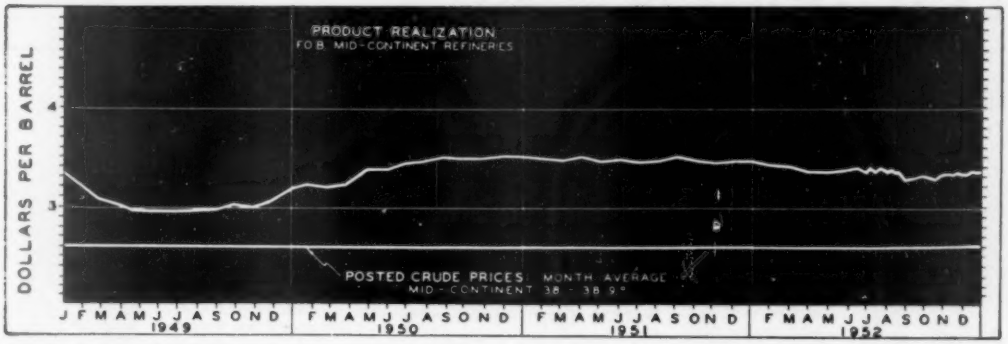
A.P.I. REFINERY REPORT, DECEMBER 27

(Thousands of barrels)

District—	Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.	Stocks‡ Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, December 1951 Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.
East Coast	1,058	433.4	50.9	263.7	222.3	31,200	12,787	37,418	11,953	1,052	418.0	44.5	282.6	245.4
Appalachian:														
District 1	116	54.6	8.3	18.0	15.4	4,070	524	1,634	652	104	44.4	6.6	16.4	13.6
District 2	94	47.1	6.4	14.9	17.8	1,933	296	615	252	83	38.9	5.6	12.0	19.3
Ind., Ill., Ky.	1,323	685.0	102.0	254.8	173.4	28,678	6,013	18,923	5,092	1,253	643.6	81.4	234.6	188.9
Okla., Kans., Mo.	560	334.0	14.1	132.4	66.6	14,532	1,660	12,078	1,549	540	301.2	18.0	127.0	70.7
Inland Texas	283	187.3	11.6	52.9	42.3	5,396	436	1,993	1,020	244	173.1	16.6	37.5	41.2
Texas Gulf Coast	1,752	841.6	146.4	437.3	286.4	18,777	2,755	12,818	7,365	1,629	747.2	149.3	379.0	253.0
La. Gulf Coast	571	273.3	70.9	121.4	59.6	7,408	2,231	4,164	1,718	505	236.4	53.6	123.9	56.2
N. La. and Ark.	85	37.3	8.3	20.6	5.7	2,837	465	872	198	73	32.0	6.9	17.1	8.0
Rocky Mountain:														
Other Rocky Mtn.	236	117.0	6.7	47.7	46.6	170		63	38	17	10.5	0.7	2.4	3.9
California	981	410.3	10.7	208.3	296.1	4,683	404	1,891	943	217	102.8	5.4	48.6	52.6
						14,741	387	11,216	17,882	929	401.4	4.0	160.6	359.9
Dec. 27, 1952	7,077	3,431.9	436.3	1,574.9	1,236.1									
Dec. 20, 1952	6,928	3,356.7	420.3	1,511.9	1,304.9	134,425	27,958	103,685	48,662	6,646	3,149.5	392.6	1,441.7	1,312.7
Dec. 29, 1951	6,763	3,211.1	360.4	1,503.1	1,338.7	131,017	28,652	105,884	48,504					
New Mexico	18	11.0		2.9	3.9	133,070	27,679	89,744	43,751					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines.

(Data for January 3 are shown in News Section)


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
4
3
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38° - 38.9°
J F M A M J J A S O N D
1949
F M A M J J A S O N D
1950
F M A M J J A S O N D
1951
F M A M J J A S O N D
1952

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate and fuel oil. Realization averaged $3.35 for week ended December 27, $3.36 for previous week, and $3.48 for December 1951. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of January 7, 1953. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10¼-10½	12.125-12.75	10¾-11
Premium gasoline, 86-88 octane	11⅜-11½	13.25-14.0	11¾-12
42-44 w.w. kerosine	8¾-9	10.5-10.65	9
No. 2 straw fuel oil	7⅝-8	9.6-9.65	8
No. 6 residual	$0.85-1.00	$2.10-2.25	$1.50-1.65

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	6⅞	6⅜	6⅝
Grade 18-55	8.25	7.75	8.0

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	22-23
200 vis., No. 3 neutral, 0-10 pp.	12-13

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t. neutral	31.5

WAX

Mid-Continent

132-134 A.M.P.	5.5

PRIMARY suppliers are watching product movement closely for effects of colder weather on markets in the northern and northeastern states. For the first few days of the year, distillates and kerosine were offered on the New York market with some prices under the normal postings of 9.65 cents a gallon for No. 2 and 10.65 cents for kerosine.

The promise of colder weather took most of the low-price material off the market. Very little distillate was available Monday at under-the-market prices. The strength of the fuel markets, both light and heavy, will depend for the most part on weather for the next 6 weeks.

Most of the decrease in distillate stocks for the week ended December 27 came in Districts 1 and 3, but at the end of the period distillate inventories in these districts were still about 6,100,000 bbl. greater than last year.

Lower tanker rates, compared with last year, make it possible for suppliers to deliver heavy fuel to points north of Hatteras for enough less than last year to weaken the market each time stocks start to increase.

Heavy fuel on the inland markets still shows more strength than in January 1952. District 2 stocks of residual on December 27 were down 16 per cent or 1,326,000 bbl. from corresponding date a year earlier.

Colder weather in the North Central states will increase deliveries out of pipe lines, but it will take low temperatures over a period of several weeks to create the big tank-car market needed to help Mid-Continent refiners not on the pipe line.

While the colder weather has helped to move fuels, it has tended to reduce gasoline consumption. Refinery gasoline in tank cars is freely available in the Mid-Continent area. Some regular-grade gasoline was reported offered for resale at near distress prices. Total gasoline stocks in District 2 are slightly under last year.

CRUDE PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.93			
19-19.9	1.98			
20-20.9	2.03	$2.25		$2.12
21-21.9	2.07	2.27		2.14
22-22.9	2.12	2.29		2.16
23-23.9	2.18	2.31		2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9		2.51	2.74	2.38
34-34.9		2.53	2.76	2.40
35-35.9		2.55	2.78	2.42
36-36.9		2.57	2.80	2.44
37-37.9		2.59	2.82	2.46
38-38.9		2.61	2.84	2.48
39-39.9		2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico.

Last general price change represented a 50-cent increase, effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.	
Kettleman Hills, California*	$2.80
Louisiana:	
Beauregard Parish	2.60
Cotton Valley (distillate)	2.85
Cotton Valley (crude)	2.70
Texas:	
East Texas	2.65
Pecos County (Yates)	2.35
Conroe	2.83
Van	2.48
Pennsylvania Grade:	
Bradford	4.25
Southwest Pennsylvania	3.82
West Virginia	3.76
Illinois Basin	2.77

*37°-37.9°

EQUIPMENT MEN . . . in the News

Honeywell Elects Seidel To Vice Presidency

G. E. SEIDEL

Glenn E. Seidel has been elected a vice president of Minneapolis - Honeywell Regulator Co. in charge of engineering in the company's Minneapolis plants, Harold W. Sweatt, president, recently announced.

Seidel, a member of Honeywell's engineering organization since 1943, has been director of the company's expanding ordnance division for the past year and a half. Before that he served for a number of years as assistant to W. J. McGoldrick, vice president.

In his new post, Seidel will have complete responsibility over research activities and all engineering work carried on in the Minneapolis plants.

Round Chain Group Names Ehlenfeldt As Ad Manager

Donald E. Ehlenfeldt has been appointed advertising manager of Round Chain Companies, in charge of advertising and sales-promotion activities for this group of firms, it has been announced by James W. Dickey, vice president and treasurer.

Prior to joining Round Chain, Ehlenfeldt served 6 years as sales-promotion manager for Willard Storage Battery Co.

The Round Chain group now includes 11 companies manufacturing chain, material handling equipment, and related products. Plants are located in Bridgeport, Trenton, Cleveland, Birmingham, Chicago, Seattle, Portland, San Francisco, and Los Angeles.

Duty Made Sales Engineer Of Airetool's Houston Branch

Artis M. Duty has been named sales engineer in the Houston branch office of The Airetool Manufacturing Co., Springfield, Ohio, according to W. T. Hamilton, president of the firm.

Duty has a degree in mechanical engineering obtained from Texas A. & M. He will call on refineries, pipe-line operators, and drilling contractors, to acquaint them with the Airetool line of tube-cleaning and tube-expanding equipment and oil-refinery specialties.

In addition to the Houston office, Airetool Manufacturing maintains branch offices in New York, Chicago, Philadelphia, Tulsa, Baton Rouge, and Hudson Heights, N. J.

Barton Appointed Field Technician by Filtrol

Walter Kitchens, supervisor of adsorbent sales, Filtrol Corp., has announced the appointment of James D. Barton as field technician, lube-oil division, Filtrol sales. In his new capacity Barton will call on lubricating-oil customers throughout the United States.

W. KITCHENS

J. D. BARTON

Barton, a graduate from University of Missouri in chemical engineering, has spent the last 4 years with Filtrol. For 3 of these years he served in the technical sales-service laboratories, and 1 in the technical sales force.

H. H. Glen Resigns From Emsco Board of Directors

Hugh H. Glen has submitted his resignation as chairman of the board and director of Emsco Derrick & Equipment Co. The board has accepted his resignation, which was effective December 31, 1952. Glen was elected chairman of the board of Emsco in May 1952 to be effective July 1, 1952, after having served as president of the company since 1939.

Ford Is Named District Supervisor by Magcobar

Frank Ford, Jr., has been promoted to district supervisor of the Houma, La., district of Magnet Cove Barium Corp., Willard M. Johnson, Magcobar president, has announced.

Ford has been located in the Houma district since he was employed by Magcobar in 1948. He replaced R. E. Hinchliffe, who was transferred to the Lake Charles district as supervisor.

Before joining Magcobar, Ford worked as a rotary helper with Shell Oil Co., Bankhead Drilling Co., Sugarfield Oil Co., and Loffland Bros. Drilling Co.

American Iron & Machine Elects Officers

American Iron & Machine Works Co. held its annual meeting of stockholders and board of directors in December 1952 at the main office and plant in Oklahoma City. All officers and board members were reelected. Pictured are: J. A. Gray, board chairman; V. L. Thomas, secretary-treasurer; E. E. Rubac, executive vice president and assistant general manager; M. G. McCool, president and general manager; and Cecil N. Cook, vice president and general counsel. A. J. Farfel, not present, was elected assistant secretary and a member of the board.

Universal Oil Products Opens New Des Plaines Plant

Editors and representatives of the leading petroleum publications were among the first visitors to tour this new administrative and engineering building recently completed by Universal Oil Products Co. at Des Plaines, Ill. Each guest was given a brochure telling the interesting facts and figures about the building. After the tour the guests were served a luncheon in the cafeteria.

Bethlehem Names Spalding To Gulf Coast Division

J. V. SPALDING

J. V. Spalding has been appointed division sales manager of the newly created Bethlehem Supply Co. Gulf Coast division, effective January 1, 1953. Spalding, with headquarters in Houston, will be directly responsible for city sales in Houston, and also all store sales and activities along the Gulf Coast from McAllen, Tex., to Laurel, Miss. Included in this territory are 3 districts, 11 stores, and 3 sales offices.

Spalding has 13 years' experience in the Bethlehem organization, having started in the Tulsa office as a sales engineer in February 1939. Since that time he has had various sales responsibilities in Illinois, Houston, and Tulsa. His most recent transfer was to return to Houston from Tulsa on January 1, 1950, as division manager, machinery sales.

Assisting Spalding in Houston will be W. J. Brady as resident sales manager in charge of sales and all other activities of the Houston sales office. Brady is being transferred from Corpus Christi, where for the past 3½ years he has been district manager of the Southwest Texas district.

T. C. Graham replaces Brady in Corpus Christi, and he will assume the duties of district manager of the Southwest Texas district. Graham has had both plant and sales experience during his 11½ years with Bethlehem. He has worked in both the Tulsa and Corsicana plants, and is being transferred from his present responsibilities as city salesman in the Oklahoma City district and sales office.

Guy Brown, Jr., has been named division machinery sales representative with headquarters in Houston. Brown came to Bethlehem in July 1940, having completed the Bethlehem Steel Co. sales training course. His work with Bethlehem has included various sales responsibilities in Tulsa, Dallas, Oklahoma City, San Antonio and, most recently, Houston.

J. & L. Names Case to Canadian Operations

Leo S. Case has been promoted to assistant manager of Canadian Operations for Jones & Laughlin Steel Sales Co., Ltd., Supply Division, and will make his headquarters in Calgary, Alta., Canada.

Formerly salesman for the Louisiana-Gulf Coast district, Case has been located in New Orleans.

Case started with the supply company in 1937 as a storeman at the Oklahoma City store. He later served at stores in Grayville, Carmi, Fairfield, and Clay City, all in Illinois, before going to the New Orleans store.

Correction

R. F. GREGG N. D. LANE

In a story relating to a reorganization within Continental Supply Co. published in the January 5 issue, an unfortunate transposition of type resulted in incorrect identification of R. F. Gregg and Noble D. Lane, both Continental district managers. We are glad to rerun pictures of Gregg and Lane with correct identification.

Century Appoints Clayton, Bediz to New Positions

Neal Clayton has been appointed assistant manager of the domestic field division, according to an announcement by Ben F. Rummerfield, vice president of Century Geophysical Corp., Tulsa.

Clayton is a graduate of Mississippi College with a degree in physics and has a master's degree in physics from Louisiana State University. He has had 16 years' experience in seismic exploration, including 2 years in Venezuela. In addition Clayton has worked in all the oil provinces of the United States, and has specialized in surface and pattern shooting as applied to areas which are particularly difficult to work by seismic methods.

NEAL CLAYTON

P. I. BEDIZ

Announcement also is made of the promotion of P. I. Bediz to the position of chief geophysicist of Century for both its domestic and Canadian operations. Bediz is a graduate of the Galatasaray Lyceum in Istanbul, Turkey, and attended University of Istanbul. He later transferred to Colorado School of Mines and received his geological engineering and master of geophysical engineering degrees. Bediz has had 11 years of seismic experience during which time he worked in several major oil provinces of the United States and Canada. He has spent the past 3 years in Canada, where he served as supervisor and chief geophysicist for Century.

Emerson Is Given Executive Appointment by Borg-Warner

A top executive appointment in Borg-Warner Corp. was disclosed with an announcement that Harry L. Emerson will become president and general manager of the Rockford Clutch Division.

Emerson, previously vice president in charge of manufacturing, succeeds Arch A. Warner, who has been appointed president of the Mechanics Universal Joint Division of Borg-Warner.

R. C. Ingersoll, president, also announced the promotion of G. L. Christianson to the position of executive

vice president of Rockford Clutch. Christianson previously held the title of vice president and general manager.

Hall Rejoins McCullough As Regional Sales Manager

After an absence of 2 years, D. J. (Don) Hall has returned to McCullough Tool Co. in the capacity of regional sales manager for the Western and Rocky Mountain divisions.

Hall first joined McCullough in August 1942 as a salesman in the Bakersfield area. In 1945 he became sales manager of the Bakersfield district. In 1950 he joined Great Lakes Corp. as regional manager of the California, Rocky Mountain, and Canadian divisions.

In his new capacity, Hall's scope of activity will include all phases of sales and sales promotional work in the Western and Rocky Mountain divisions.

Macwhyte Appoints Burns Factory Representative

Thomas E. Burns has been appointed direct factory representative for Macwhyte Co. with headquarters in Houston. He will represent the wire-rope manufacturer in its Houston territory, including an area in Louisiana. Burns has been employed by Macwhyte in various capacities for the past 12 years.

Ensign Carburetor to Expand Los Angeles Facilities

To further meet the demands for Ensign carburetion equipment for natural gas and propane, Ensign Carburetor Co. has announced the purchase of a 5-acre site east of Los Angeles for a new factory and laboratory.

Newly developed laboratory equipment for complete studies of L.P.G. behavior and utilization, particularly with respect to internal-combustion-engine use, has been completed at Ensign's present plant. The entire facilities of this modern laboratory will be relocated at the new plant site.

Hercules Motors Corp. Opens New Oil Field Branch

The increased use of Hercules gasoline and diesel engines and power units throughout the oil fields has resulted in the opening of new sales and service facilities in Oklahoma City by Hercules Motors Corp. The new branch provides ample space for stocks of Hercules engines and power units available for immediate delivery. Other facilities include a modern service department with an adequate stock of parts, as well as a large, modern, fully equipped machine shop where engines and power units can be economically repaired, overhauled, or rebuilt. This branch will be under the supervision of J. A. Embry, manager of Hercules oil-field division.

Gar Wood Holds Series of Truck Crane Demonstrations

Gar Wood Industries, Inc., Findlay division district managers and sales personnel conducted a series of 75BT truck-crane demonstrations as part of a 2-day shovel sales school held in November 1952 at Findlay, Ohio. In attendance were, back row: E. W. Hazzard, export manager; Gil E. Koehler, district manager; H. N. Nelson, assistant sales manager; W. M. McAllister, district manager; J. Frisby; Spencer Wright; Jim W. Killen, district manager; Harold Clark, district manager; W. C. Schult; Dick Steegman, assistant sales manager; W. C. Robertson, vice president, New York and Washington office; H. C. Hatch; Dale Ollendorf; Ken Keyes, works manager; A. F. Dries; Jack Nichols; R. S. Jay, Findlay sales manager. Front row: W. G. Barrett, district manager; Dave J. Davis, assistant sales manager; Ernie Schulz; G. E. Miller, chief engineer; E. R. Curry, district manager; George Ames, district manager; Allen F. Closser, district manager; Kieth Rowe; R. O. Gerdeman; W. F. Wittenmyer, district manager; A. M. Guthrie, district manager; E. B. Hill, vice president, director of sales and advertising.

Welex Names Vaughan As General Sales Manager

J. B. VAUGHAN

Welex Jet Services, Inc., Fort Worth, recently named J. B. Vaughan as general sales manager, replacing A. M. Birnie, who resigned from the company.

Vaughan was formerly with Great Lakes Corp. where he was assistant general sales manager. He has also been associated with Halliburton Oil Well Cementing Co. and Fred M. Manning, Inc.

Braden Elects Fagan Vice President, General Manager

William D. Moorer, president of Braden Steel Corp., has announced that the board of directors has elected Leo P. Fagan to the position of vice president and general manager, and that Luther J. True has been elected secretary. At the same meeting R. Earl Elkin was promoted to general sales manager.

(Continued on page 182)

Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY... CLASSIFIED ADVERTISING

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1 OILWELL Steam Pump, 16¼ x 7¾ x 20". This pump is in excellent condition, may be seen at Makin Drilling Company Yard, Hobbs, New Mexico. Makin Drilling Company, Box 1628, Hobbs, New Mexico.

WILSON SUPER RIG, Jaw Clutch in drum, completely rebuilt with new parts, with rebuilt American Simplomatic Cathead, New Ford 239 Engine and transmission, new 7" x 8" x 65' Double Mast Pole with 3 18" Roller Bearing Sheaves, new steel sub-skids extended for rotary table. A fine rig for 1500' Drilling. Call Don Gaetz, Phone 3-1497, Wichita Falls, Texas.

STORAGE TANKS — FOR SALE: 55,000 bbl. steel tanks with steel roofs. Located Henrietta, Texas, on Railroad siding. Jimmy Heath, Henrietta, Texas.

GASOLINE PLANT FOR SALE

Buildings, Engines, Compressors, Electric Generators, Electric Motors, Pumps, Boilers, Tanks, and Pressure Vessels.
Plant located near Seminole, Okla.

SINGER SUPPLY CO.
Box 755 Tulsa, Oklahoma

For Sale
Used Equipment

1—7¼x14 Model 11,000 Wheland power mud pump. Complete with 60" drive sheave and unitized with Model JL 1335 Buda engine equipped with butane equipment. This unit assembled on one set of sub-skids with mud gauge shear relief valve and suction.
1—Wilson Giant 1942 Model drawworks less engine. Completely overhauled.
1—3½x10 National Transit water pumping unit, skid-mounted with Model PA 50 International engine equipped for butane.
1—Model 34-26 National steam drawworks completely overhauled and never been run.
2—7½ KW General Electric Thyrite generators completely reconditioned and with new factory guarantee.
1—5 KW General Electric Thyrite generator, same as above.
1—National 50 3-engine V-belt compound complete with engine clutches for WAK Waukeshas.
1—Western Iron & Foundry V-belt compound to accommodate 2 LRO Waukeshas.
1—Wilson Titan internal clutch type drum assembly complete with new Lebus wire line grooving.
2—Wilson-Atlas drum assemblies complete, one with Lebus groove and one without grooving.

JOHN C. BURGE INC.
2800 South High, P. O. Box 4356
Oklahoma City 9, Okla.
Tel. ME 8-3358

EQUIPMENT FOR SALE

FOR SALE: Six Type 80 Cooper Twin Compressors. Good Condition. Alfred B. Kern, 223 Wright Bldg., Tulsa, Oklahoma.

SIX CHAPMAN #58½—30 inch low pressure, double disc gate valves, rising stem, flanged ends. Write, wire or call. Used but like new. Continental S & R Company, McCook, Illinois.

SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

WELL drilling equipment, new or used Spudders, rotaries, core & shot hole drills, tools, pipe, bits, blocks, pump jacks, valves. Everything for well drilling and service. Fishing tools rented. Pressey & Son, Pueblo, Colo.

NO. 1 USED MERCHANDISE FOR SALE

10,000 Feet of 24" OD DRL ⅜" Wall Seamless Line Pipe.
35,000 Feet of 6" OD 9.6# SRL Line Pipe.

BETHLEHEM SUPPLY COMPANY
Tulsa, Oklahoma
Box 2171 Phone 5-9261—Ext. 361

LINE PIPE FOR SALE

50 miles of 2¼" O.D. X 0.140" wall seamless steel tubing, 30 ft. lengths, beveled for welding, tested 1000#. A perfect substitute for 2" line pipe.

Attractively priced for quick sale.

Call, Wire or Write

Thomas A. Schierman
2822a Victor St., St. Louis, Mo.
Phone: Grand 6434

FOR SALE
2 Climax Engines

245 HP at 1200 RPM—Model R81.
Complete with radiator and clutch.
Butane operated.
Price $3000 each.
Also 3000 gal. butane tank, $600.

JAMES B. ALLEN
P.O. Box 212, San Carlos, California
Phone Lytell 3-0413

EQUIPMENT FOR SALE

FOR SALE OR TRADE: 3½", 4", 4½" OD Sonoscoped Drill Pipe. Complete Rotary Rig and Equipment. Nat'l 3 Cable Tools, R L Cardwell Spudder. Cable Tools from 5½" to 18". Milford Giffin, 477 Hoisington, Kansas.

2 FAILING Model 1500 drills, shop number 966 mounted on KBS-7 1947 International truck, shop number 909, of special design mounted on GMC 6 x 6. Both drills in good condition and reasonably priced. Write for prices and list of equipment. Box G-193, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 40,000 ft. #1 3½" O.D. standard plain end line $0.55 per ft. 20,000 ft. 4" O.D. flues. Rogers Pipe and Supply Company, Phone 5-8850, Tulsa, Oklahoma.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

Reconditioned Seamless STEEL TUBING

Ideal for gas, water and air lines

2" O.D.
2¼" O.D.
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Approximately 5 miles of each diameter available in single or double random lengths with beveled ends.

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EQUIPMENT FOR SALE

FOR SALE: Cardwell S Hoist Waukesha GK-145 Engine Trailer, 90′ Mast, Block-hook, etc. Good Condition. Terms. Wilson Atlas Draw Works—2-LI-600 Cummins Diesel Engines, 7¼" X 14" Ideal Mud Pump. Other items. Terms Reasonable. Phone, write, wire. Cecil Hilliard, Cardwell Sales Representative, Houston, Texas. Box 590 AB, Route 3.

FOR SALE: R. L. Dubbledrum Cardwell fully equipped. Oklahoma City, Oklahoma, Melrose 8-9234.

FOR SALE: Two 10" x 20" Clark type S Extra Heavy 300 lb. W.P. compressor cylinders. Four 6" x 20" Clark type SB 1000 lb. W. P. compressor cylinders. Above cylinders in excellent condition and all equipment for complete installation including bedplate spacers. Also two 17" x 20" Clark type S compressor cylinders and thirteen 16" x 20" Bessemer type VH compressor cylinders in fair condition. N. L. Dalton, 1229 Charles, Pampa, Texas. Telephone 1399.

GAS METERS FOR SALE. Westcott, Foxboro and Emco. Good condition. Geo. R Milner, Box 124, Okmulgee, Oklahoma.

CASING—7" OD 26# Grade J55 Youngstown Range 3 with Hydril Speedite Threads, Streamline, 5300 feet, located Magnolia, Arkansas. Condition like new. Price OPS ceiling. Contact Sam Siegel, Phone 4-6512, Shreveport, Louisiana.

2,500 FT. Fred Cooper Rotary mounted on a low boy trailer, 7½ x 10 Gaso Mud Pump powered by Model L Allis-Chalmers Engine. All propane equipped. Unit was purchased new in August 1952. 17,050 ft. of 3½-in. drill pipe and one 4¾-in. drill collar. Doghouse, water tank, and all necessary small tools. Will furnish contracts for part of purchase price. Contact Bert Young, Box 311, Eureka, Kansas, or Phone 141.

FOR SALE: One (1) Cornell Lummis Homogenizer, 2,000 gallon per hour capacity, complete with meters, proportioners, pumps and electrical controls. Box G-237, The Oil and Gas Journal, Tulsa, Oklahoma.

6½" X 2¾" X 5½" Gardner Denver Vertical Duplex two stage water cooled compressor. Happy cooler. Skid mounted with Waukesha engine. Located Walnut, Kansas. Call Dallas, Texas, RIverside 6811.

EQUIPMENT WANTED

GOOD used swabbing unit suitable for 5200 feet. Goodall Electric Manufacturing Company, Ogallala, Nebraska.

WANTED — 36L Bucyrus - Erie Spudder with top to bottom tools. Mail inventory and price to 152 N. Emporia Street, Wichita, Kansas.

MAYHEW Model 1000 rotary drill 1946 or newer in excellent condition, with or without water truck, drill stem and bits. State cash price and condition in first letter. Western Drilling Company, Medicine Lake, Montana.

TO RENT or purchase on rental basis, one complete 3000-4000 jack-knife rotary rig, 4½" drill pipe, 12" or 14" pump for use in Dallas area. Give description, location, age, price. Texas Water Wells, Inc., 951 McCarty, Houston, Texas.

USED Wilson super single service winch or any parts thereof. Write: Lee, P. O. Box 2903, Beaumont, Texas.

40,000' used 2⅞ upset tubing. Four 140,000 lb. pull pump jacks. Goodall Electric Manufacturing Company, Ogallala, Nebraska.

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle, producing equipment is worth dollars. Greer Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

WANTED: Three engine compound to Wilson Titan drawworks. Makin Drilling Company, Box 1628, Phone 3-3141, Hobbs, New Mexico.

PRODUCTION WANTED

WANT producing wells in paraffin or heavy oil areas where heating bottom hole fluids with Parelex Electric Heater could increase production. Parelex Corporation, Box 552, Houston 1, Texas.

HELP WANTED

OIL SECRETARY: Age 35 to 45, for independent oil company in Oklahoma City. Must be expert stenographer, well experienced in oil production and operations. Must have excellent character and references. Sal. $350 per mo. with raises commensurate with ability. P.O. Box 1824, Oklahoma City, Okla.

GEOLOGISTS
needed in
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Attractive staff positions are available for qualified Geologists with several years' professional experience in surface, well-site, or oil production geology.

Write giving age, marital status, education and detailed experience.

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HELP WANTED

GEOLOGIST wanted to headquarter in Denver with independent oil company. Must have well sitting, sample examination and mapping experience, and at least two years experience in Rocky Mountain Area. Reply will be kept confidential. Box G-264, The Oil and Gas Journal, Tulsa, Oklahoma.

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FOR OVERSEAS POSITION WITH LARGE OIL COMPANY

Must be 25 to 35 years of age, graduate of recognized engineering college, with minimum 3 years intensive experience in all phases of oil field drilling, development and production. Exceptional opportunity for single man, or married man agreeable to 1 year separation period. Salary commensurate with ability and experience plus living and separation allowances and complete employee benefits. Send complete resume.

Reply Box G-261
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

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Affiliates of
STANDARD OIL COMPANY (NEW JERSEY)
located in South America
need

Metal Inspectors:

Engineering degree and several years metals inspection experience required. Will inspect refinery process equipment and request renewals where corrosion, failure, or defectiveness under safety codes make necessary.

Mechanical Engineers:

Qualified engineers experienced in: design of refinery and related equipment including utilities; materials listing and specification; and/or refinery maintenance engineering.

Petroleum Engineers:

Degree and several years professional experience in drilling, production, reservoir studies, or petroleum laboratory required.

These are regular staff positions offering liberal salaries and benefit plans.

WRITE

giving complete address, age, marital status, education, and details of previous experience.

Box 308-U, Radio City Station, New York 19, New York.

HELP WANTED

"JUNIOR PETROLEUM ENGINEER"
For Venezuelan assignment with major oil company. Should have engineering degree and limited field experience. Give full details in reply to P.O. Box 2819, Dallas, Texas.

GEOLOGIST
With major company experience in the Mid-Continent Area. Independent oil company has opening around January 15th. Age 30-40. Applicant must know all phases of geological duties. Good position for right party. In replying give past employment record, educational background, and salary expected. Reply Box G-244, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL Industry Employment Service, 405 Tuloma Bldg., Tulsa, Okla. 4-5974. Tom Robinson, owner. For Technical and Trained Personnel, including LPG.

SEISMIC PERSONNEL needed for United States and Canada by well known and expanding contract geophysical company. Address Box E-863, The Oil and Gas Journal, Tulsa, Oklahoma.

"GAS MEASUREMENT ENGINEER"
For Caracas, Venezuela. Supervises meter section, calculating procedures, chart clerk and various tests. Should have college degree and minimum of six years experience in gas measurement department of natural gas utility company. Liberal salary and living allowance. Give full details in reply to P.O. Box 2819, Dallas, Texas.

GEOLOGIST with Canadian or Rocky Mountain experience wanted by independent oil company to headquarter in Calgary. Replies will be kept confidential. Box G-265, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER

Engineer wanted with experience in rating and writing specifications for heat exchangers. Good salary and all employee benefits.

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2500 So. Atlantic Blvd.
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ENGINEERS
DESIGNERS
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PIPING • CONCRETE
ELECTRICAL
STRUCTURAL STEEL
PRESSURE VESSEL

Must have a minimum of two years engineering in college and minimum of three years experience.

Now working 45 hours. Time and one-half for over 40 hours. Moving allowance. Location: Tulsa, Oklahoma.

REFINERY ENGINEERING
Company
Wright Bldg. P. O. Box 1558
TULSA, OKLAHOMA

HELP WANTED

"GAS TRANSMISSION SUPERVISOR"
For Venezuelan assignment. Must have supervisory experience with gas pipe line company in meters, line construction and repairs, dehydration plant, etc. Give full details in reply to P.O. Box 2819, Dallas, Texas.

ROCKY MTN. PETROLEUM Industry vacancies for drilling, production and reservoir engineers, office and field geologists, process engineers and refinery operations supts. Also need experienced draftsmen and cartographers. Write Professional Placement Service, 516 University Bldg., Denver, Colo.

SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: 'Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No 528, Ph No 3-3141, Hobbs, New Mexico.

EXECUTIVE SECRETARY - CONFIDENTIAL ASSISTANT offers unusual and long experience in oil producing business to top oil executive in Texas, Oklahoma, or Louisiana who needs good right-hand man. Also experienced office manager, accountant, corporation secretary. Presently employed but seek connection where full ability will be utilized. Accustomed to heavy responsibilities. For interview write Box G-238, The Oil and Gas Journal, Tulsa, Oklahoma.

OFFICE MANAGER-MATERIAL MAN—11 years' experience in procurement, warehousing, distribution of oil-field materials; perpetual inventory systems, payroll, drilling, production and pipeline records. Age 36. Box G-239, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: 2½ years major experience in Mid-Continent-surface, subsurface, well supervision. Desire position in Rocky Mountain, Williston or San Juan Basin. Retainer or salary basis. Graduate of University of Colorado. Box G-249, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED PRODUCTION ENGINEER Foreman, desires change, age 32, married, bilingual. 6½ years experience well completions, workovers, treating, artificial lift, construction, production supervision. Presently employed by major Oil Company in South America. Box G-243, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE Petroleum Engineer — Seven years diversified experience with major. Desire responsible position with independent operator or drilling contractor. Box G-250, The Oil and Gas Journal, Tulsa, Oklahoma.

REFINERY Engineer—Experienced in design, construction and maintenance supervision of fluid and Thermofor crackers, pipe stills and product treating. Age 29. Desire relocation midwest. Box G-248, The Oil and Gas Journal, Tulsa, Oklahoma.

B.A. & L.L.B., 5 years' experience title examination & Real Estate transactions with Law firm in Pennsylvania. Desires work with Oil Company in Land Department or Lease records, preferably in southwest. Robert Kerr, 320 College Avenue, Beaver, Pennsylvania.

GEOLOGICAL engineer, now employed, age 29, veteran 2½ years subsurface and well-sitting with independent. Prefer position in Rocky Mountains or West Texas-New Mexico areas. Box G-266, The Oil and Gas Journal, Tulsa, Oklahoma.

COMPANY with foreign and local Geological and core hole experience seeks contracts for either, or supply. Complete Geological information to majors or independents. Box G-260, The Oil and Gas Journal, Tulsa, Oklahoma.

AVAILABLE EXECUTIVE

20 yrs. experience in petroleum refining operations and plant management desires connection with refiner or equipment manufacturer as district sales representative.

Box G-252
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

SITUATIONS WANTED

ATTORNEY, LANDMAN: LL.B. from Canada; Doctor of Law from University of Chicago, U. S. and Candian oil company experience in legal and land work. Presently employed in Oklahoma. Desire position with opportunity for advancement—either domestic or foreign. Box G-257, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER, 1950 graduate, 31, married, child, locate anywhere, limited experience, desires position requiring initiative, responsibility, integrity, hard work; offering opportunities for learning, acquiring practical experience, earning advancements. Box G-256, The Oil and Gas Journal, Tulsa, Oklahoma.

MECHANICAL ENGINEER—BSME, JUNE '50—Age: 27—Single—Veteran—Desires foreign employment—Europe or Latin America—One year experience in machinery manufacturing. Presently employed by oil company. Resume upon request. Box G-255, The Oil and Gas Journal, Tulsa, Oklahoma.

AGGRESSIVE landman and attorney. Four years experience. Desires connection with company or independent in job of responsibility and future. Excellent references. Box G-263, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Geologist, Age 47, married, now in consulting capacity, wishes to reenter Oil Company, staff, research or coordination; subsurface geology, paleogeography, geophysics. Prefer foreign; would consider domestic. Box G-262, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER, BS.E.E., 37. Power, control, telemetering, carrier, radio, instruments, cathodic protection. Box G-258, The Oil and Gas Journal, Tulsa, Oklahoma.

ROYALTIES

JACK EAGLE—Pay you immediately for your producing royalties and Overrides, absolutely no delay, send complete details 706 City Nat'l Bldg., Okla. City, Okla. REgent 6-7027.

PRODUCING royalty for sale, 1⅛ acres, paying approx. $155.00 per month, 4 wells, WILCOX SAND. Lease making approx. 12,000 bbl oil per month. NW NW S27-T17N-R1E, Logan County, Okla. (Haynes Tract). Price $8,150.00. Box G-246, The Oil and Gas Journal, Tulsa, Oklahoma.

GET TOGETHER: Both Capital and Royalties are available. If the investment proposition you want isn't listed in this column, use a Journal classified advertisement to find it. See box heading for classified rates, or write The Oil and Gas Journal.

WE WILL buy producing or non-producing oil royalties. Standard Security Company, 111 Broadway, New York 6, N. Y.

PERMIAN BASIN MINERALS

Between Denton-Pegasus new deep trend along Central Basin Platform, as per Dec. 29th issue, page 121. Fully participating, $1.00 rentals; lease expires 4 yrs. Sell 40 to 200 acres at $35.00 per acre, subject prior sale or withdrawal. Also other royalty near AMERADA #1 Weems Yoakum Devonian discovery. Box G-254, The Oil and Gas Journal, Tulsa, Okla.

LEASE AND DRILLING BLOCKS

DRILLING two wells in Williston Basin, North Dakota. One in Sec. 23, Twp. 159N, R. 94W. The other in Sec. 25, Twp. 158N, R. 93W. Both near Amerada Co. Production. Deals partially financed, balance of interest in one or both deals for sale by responsible Oil Producer. Box G-259, The Oil and Gas Journal, Tulsa, Oklahoma.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

LEASES ROYALTIES
Producing and Nonproducing
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Inquiries Invited
B. D. BUCKLEY
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LEASE AND DRILLING BLOCKS

DALLAM COUNTY, TEXAS: 8000 acres solid block one owner. ½ County leased to Major Companies. $1.25 bonus, $1.00 rentals, 10 year commercial lease. Combest Royalty Company, Amarillo, Texas.

FOR SALE: Oil and gas leases in the Williston Basin, Sheridan County, North Dakota. 10 year leases—$2.50 per acre. Minimum amount sold 40 acres. Favorably located for early development. Box G-245, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR LEASE: Three 40-acre plots in Webster Parish, Louisiana—Cotton Valley and Sibley vicinity. Box G-253, The Oil and Gas Journal, Tulsa, Oklahoma.

5000 ACRES-2800 acres GRAY COUNTY, TEXAS. Semi-proven oil and gas 3000'. Small cash bonus and little override. 5 year commercial lease $1.00 rentals. Combest Royalty Co., Amarillo, Texas.

200 ACRES LEASE. SHALLOW PRODUCTION. 10 wells, fully equipped, LaCygne, Kansas. Adaptable for water pressuring. Sell, lease, equipment $20,000. Mabes & Co., Inc., Commerce Bldg., Kansas City, Mo., Agents.

BUSINESS OPPORTUNITIES

OIL DEAL. You provide leases or production. We supply $200,000. Hoge, 405 East 54th Street, New York, N. Y.

REAL ESTATE

OFFICE space for rent—building under construction—will make changes for tenant—all on ground floor—one block from main street, close in. Forced air heat—air conditioned — well lighted — total of 17 rooms — contact Adam L. Krause, 1319 Main, Great Bend, Kans.

INCORPORATIONS

DELAWARE CORPORATIONS FORMED & SERVICED. Commonwealth Trust Co. P.O. Box 350, Wilmington, Delaware.

Central Area

(Continued from page 171)

Whitty, NW NW SE 31-9n-3w, dry, TD 2,435 ft.

White County: T. A. Payton, Sr., 1 Long, NW NW SW 35-5s-8e, dry, TD 3,451 ft. T. G. Glass 1 Barnes, SW SW NE 1-7s-10e, dry, TD 1,757 ft.

INDIANA WILDCAT FAILURE

Spencer County: E. F. Moran, Inc., and J. B. Buchman 1 Stevenson, SW NE NE 5-8s-7w, dry, TD 1,890 ft.

WESTERN KENTUCKY WILDCAT FAILURES

Davies County: John Ross and S. W. Bardill 1 Gregory, C SW SW 25-N-30, dry, TD 1,550 ft.

Henderson County: Ashland Oil & Refining Co. et al 1 St. Posey, NW NE SE 20-P-22, dry, TD 2,745 ft.

McLean County: White & Vickery 1 McManama, NE SE NE 23-L-28, dry, TD 2,107 ft.

MICHIGAN SUCCESSFUL WILDCAT

Mason County, Hamlin Township: Dow-Brazos-Taggert Unit 1 Dow-Brazos, SE NE NE 27-19n-18w, 20 bbl. oil and 20 bbl. water natural from Niagara. Perforated 255 shots 4,224-4,326 ft., TD 6,622 ft., PBTD 4,400 ft.

MICHIGAN WILDCAT FAILURES

Montcalm County, Pine Township: H. L. Gentry 1 Paulson Heirs, NE SE NW 29-11n-8w, Dundee 3,265 ft., dry, TD 3,337 ft.

Ottawa County, Wright Township: P. K. Degenther 1 Rasch, NE NE NW 12-8n-13w, Traverse 2,193 ft., dry, TD 2,295 ft.

EQUIPMENT MEN

(Continued from page 178)

Erection Begins on Chicago Pneumatic's Fort Worth Plant

The erection of the first of 400 tons of structural steel for the new Chicago Pneumatic Tool Co. plant at Fort Worth has begun, and will be completed during the latter part of January.

The plant, which will manufacture oil-well drilling equipment for the petroleum industry, will contain approximately 140,000 sq. ft. of floor space and will cost approximately 4½ million dollars to construct and equip. Installation of equipment is expected to start in February, and preliminary production operations are expected to begin by late spring.

The plant will provide facilities for machining, grinding, heat-treating, and hard-facing oil-well drilling bits. A complete line of three-cone bits, drill collars, tool joints, reaming bits and reamers, rotary subs, and junk baskets will be manufactured at the plant.

Reliance Names Perrin to Managerial Sales Post

Appointment of Andrew C. Perrin to the newly created post of West Coast district sales manager of Reliance Electric & Engineering Co., manufacturers of motors and motor drives, has been announced by E. E. Helm, sales vice president.

A sales application engineer operating out of the company's Chicago office for the past 6 years, Perrin already has assumed his new assignment, making his headquarters in San Francisco.

In his new position Perrin will be responsible for directing and coordinating the expanded sales application engineering and technical service activities covering Reliance motors and motor drives carried on by the company's Pacific Coast sales representatives, F. G. Guthrie in San Francisco, and Shaffer & Nelson in Portland and Seattle, and by H. A. Latta, manager of Reliance's Los Angeles office.

Helm has also announced the transfer of Keith E. Carter, sales engineer in Pittsburgh since March 1950, to the company's Chicago office. He takes over Perrin's former sales-engineering duties, reporting to R. O. Herbig, central western district sales manager for Reliance.

Replacing Carter in the Pittsburgh area is J. Edward House, Jr., who has been attached to the company's applied engineering and industry sales staff in Cleveland for the past 2 years. He reports to C. V. Gregory, Pittsburgh district sales manager.

Motorola Inc., Organizes Communications Subsidiary

Paul V. Galvin, president of Motorola, Inc., has announced the organization of a wholly owned subsidiary corporation, Motorola Communications & Electronics, Inc.

The new company will distribute products manufactured by the Communications and Electronics Division of the parent corporation. These products include complete mobile two-way radio systems, multichannel microwave relay systems, power line carrier, and supervisory and industrial control equipment.

No change is contemplated in the field sales personnel for these communication products as a result of the organization of the new company, and the operations of the other divisions of Motorola are not affected.

Lummus Recalls Fulton To New York Office

The Lummus Co., designing engineers and constructors for the petroleum and chemical industries, has announced the recall of David Fulton to the company's main office in New York.

Prior to recall, Fulton was for a number of years manager of Lummus' French affiliate, Societe Francaise des Techniques Lummus, in Paris. He returns to take up his newly appointed position of assistant to the president.

Emsco Changes Name To Conform With Products

Emsco Derrick & Equipment Co. has announced a change in its corporate name to Emsco Manufacturing Co., effective January 1, 1953.

"This change in name is being made," states William T. (Bill) Powell, Emsco's president, "in keeping with the wide variety of products manufactured by the company. Derricks today represent a very small part of our business and we feel that it is important to have a name that is descriptive of our entire operation."

Emsco was founded more than a quarter century ago and has plants in Los Angeles, Calif., and Garland and Houston, Tex. The firm manufactures a complete line of drilling and production equipment for the oil industry and is an important supplier of radio and television towers, structural fabrication, heavy-duty machining, and hot-dip galvanizing.

Rocky Mountain Area

(Continued from page 170)

Sinclair Oil & Gas Co. recovered oil in tests of Dinwoody at 1 Unit, SW SE SW 21-33n-95w, north of Sand Draw field in Fremont County, Wyoming. Top of Dinwoody was called at 10,256 ft. and the operator is coring for Phosphoria at the present depth of 10,318 ft. Both Phosphoria and Tensleep are to be tested in this wildcat. Both formations produced in Sand Draw field proper. Dinwoody is not normally a producing horizon in Wyoming.

In the Big Flat area of Grand County, Utah, Glen M. Ruby is credited by unofficial reports with a flow of 5 bbl. of oil per hour from the 1 Unit, SE NW NW 11-26s-19e. Complete data on the well is not available, and reports have not been confirmed. Production was unofficially reported as from the basal Paradox. The well is projected as a test to Devonian at about 8,100 ft.

Also in Utah, The California Co. has tested oil at the second Antelope Creek wildcat in Duchesne County. The well, Unit 2, C NE 30-10s-15e (SLM) made 330 ft. of oil and 95 ft. of 30 per cent oil-cut mud on drill-stem test from 4,230-90 ft. The operator is running a second test with present total depth at 4,874 ft.

In the South Lay Creek area of Moffatt County, Colorado, Carter Oil Co. has reported recovery of small quantities of gas on tests of the Mesaverde sandstone 8,625-90 ft. in the 1 Olson, NW NE NE 9-7n-93w. This wildcat is another in the recent series through this area of the Rockies, to report shows, or complete commercially in this horizon.

COLORADO WILDCAT FAILURES

Logan County: Herndon Drilling Co. 1 Donovan, NE SE NW 32-11n-52w, dry, TD 5,285 ft.

Moffat County: J. Ray McDermott & Co. 1 Government, SW NW SW 17-5n-91w, dry, TD 6,962 ft.

Rio Blanco County: Union Oil Co. 1 Ivory, C SE SE 34-2n-97w, dry, temporarily suspended, TD 3,710 ft.

Washington County: Shell Oil Co. 1 Cates, NW NW NW 8-5n-54w, dry, TD 5,042 ft.

F. Kirk Johnson et al 1 Williams, SE SE NW 29-3s-51w, dry, TD 4,656 ft.

WYOMING WILDCAT FAILURES

Campbell County: F. Kirk Johnson 1 Government, C NE NE 21-55n-70w, dry, TD 6,140 ft.

Carbon County: Continental Oil Co. 2 Unit, NE NE NE 24-16n-84w, dry, TD 1,378 ft.

Fremont County: Continental Oil Co. 1 Southeast Maverick, SE SE NE 36-6n-2w (WRM), dry, TD 1,863 ft.

Washakie County: Sprague Oil Co. 1 Government, McKinney, NW NW SW 17-47n-89w, dry, TD 2,962 ft.

WESTERN NEBRASKA WILDCAT FAILURES

Kimball County: Twin Oil Corp. 1 State, NE NE SE 10-12n-54w, dry, TD 6,024 ft.

Lincoln County: Paul B. Johnson 1 Hite, SW SE SE 25-12n-30w, dry, TD 3,974 ft.

Scottsbluff County: Jackpot Oil and Woodward Oil Co. 1 Banning, C SW NE 17-21n-56w, dry, TD 6,287 ft.

MONTANA WILDCAT FAILURE

Richland County: Shell Oil Co. 22-29 Etzel, SW SE NW 29-26n-51e, dry, TD 10,128 ft.

SOUTH DAKOTA WILDCAT FAILURE

Haakon County: Carter Oil Co. 1 Danielson, C SE NW 5-3n-38e, dry, TD 4,504 ft.

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LEGAL

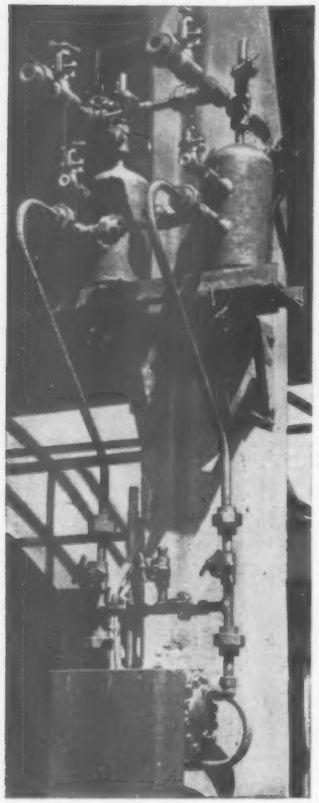
U. S. DEPARTMENT OF THE INTERIOR. Bureau of Land Management, Washington 25, D. C. Notice is hereby given that the NE¼ sec. 30, T. 33 S., R. 40 W., 6th P.M., Kansas, within the known geologic structure of the Hugoton field, will be offered for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre, at 1 p.m., Eastern Standard Time, on February 4, 1953, when bids will be opened. Details of the lease offering and how and where to file bids may be obtained by addressing an inquiry to this office. Marion Clawson, Director.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR. Bureau of Land Management, Washington 25, D. C. Notice is hereby given that approximately 994 acres of land in Ts. 34 and 35 N., Rs. 2 and 3 W., and T. 35 N., R 4 W., P.M., Montana, within the known geologic structure of the Kevin-Sunburst field, will be offered in seven parcels for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre, at 1 p.m., Eastern Standard Time, February 18, 1953, when bids will be opened. Details of the lease offering, how and where to file bids, and a description of the lands may be obtained by addressing an inquiry to the Manager of the Land and Survey Office, Billings, Montana, or to this office. Marion Clawson, Director.

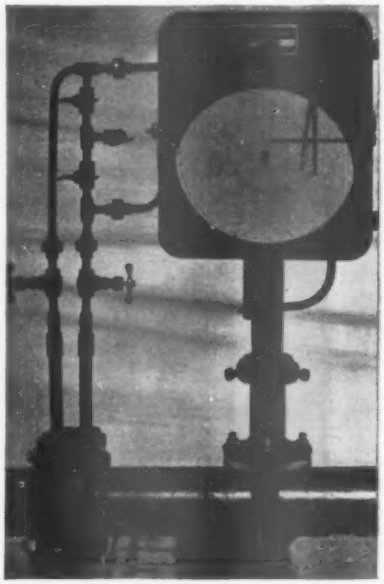
How To Save Money In
BUYING INSTRUMENT VALVES

A little extra care in choosing the proper valves for a particular instrument application can mean substantial cash savings—sometimes through a much lower initial investment, at other times through the prevention of damage to costly equipment. Here are two case histories where operators received extra value for their valve dollar through careful and informed selection.



CASE 1

—a recording orifice meter on natural gas service. Here the temperature and pressure requirements permit the use of moderately priced Fig. 152 Edward valves. These high strength low cost forged steel globe and angle valves find many applications for gage, meter, and instrument services where no extreme temperatures or pressure exist. Construction features include tight taper-threaded body-bonnet joint, drop forged steel bodies, needle point disks carefully lapped for tight seating joint. Rated for 4000 lb at 150° F or 600 lb at 750° F. Sizes from ⅛" to 1".



CASE 2

—a remote reading flow meter in a major refinery installation where line pressure is over 3000 psi. For the certain protection of costly equipment, tough applications like this demand small valves specifically designed for both high temperature and high pressure service. Ideal are Fig. 952 instrument valves, rated for 6000 psi at 100° F or 1500 psi at 1000° F. Bonnetless, all drop-forged construction for added strength. Special swing gland bolt and packing gland design permits trouble-free repacking. Furnished in globe or angle types, sizes ¼" to 1", in carbon steel or Evalloy 13% chromium stainless steel.

For complete information on the instrument valve for your specific requirements write to Department GV, Edward Valves, Inc.—1492 West 145th Street—East Chicago, Indiana.

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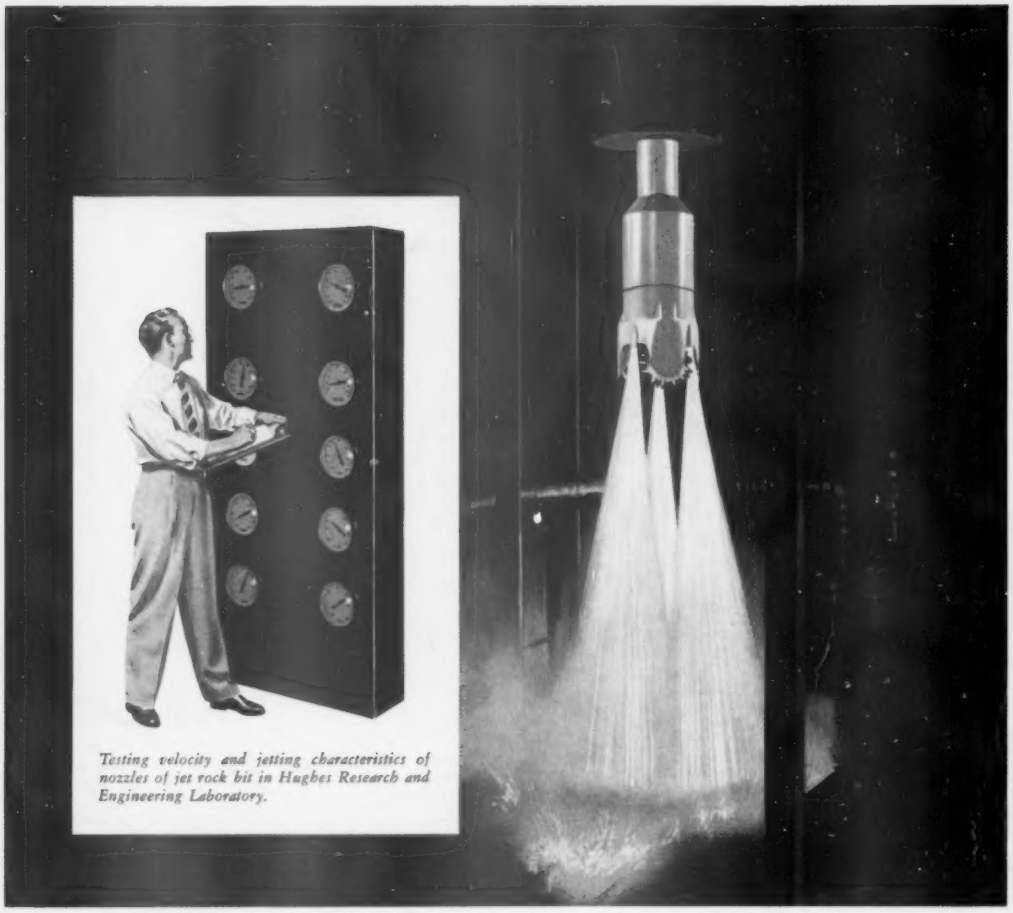

Testing velocity and jetting characteristics of nozzles of jet rock bit in Hughes Research and Engineering Laboratory.

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